

REPORT ON FORAMINIFERAL SOUNDINGS AND DREDGINGS OF THE F.I.S. "ENDEAVOUR" ALONG THE CONTINENTAL SHELF OF THE SOUTH-EAST COAST OF AUSTRALIA

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[Read 10 July 1941]

PLATES VII, VIII, IX

INTRODUCTORY

The material described was collected by the "Endeavour" about the year 1912. Captain Dannevig forwarded it to me through the late Robert Etheridge, Jnr., together with a schedule of the samples dated 23 June 1913. Two other samples of soundings, collected about the same time, and included in this schedule, have already been described.⁽¹⁾ Unavoidable delay in carrying out further descriptions of this interesting material has been due to stress of official and private work prior to my retirement as First Commonwealth Palaeontologist.

SCOPE OF INVESTIGATION

The present Report relates to the soundings marked E 3915 to E 3923, comprising all those samples located towards the eastern end of Bass Strait, near the boundary of Victoria and New South Wales, chiefly east by south from Green Cape; east from Babel Island; and on the eastern edge of Bass Strait.

As these soundings range from 65 to 505 fathoms, the results have a direct bearing on the form and contour of the continental shelf around the south-eastern coastline of Australia, in which the late Capt. Dannevig was so keenly interested. (See Biol. Res. F.I.S. "Endeavour," VII—The Continental Shelf of the East Coast of Australia, 3, (6), 1915). The remainder of the Samples included in this collection, reserved for a further Report, were chiefly obtained from localities centred about the Great Australian Bight, off Eucla.

These Reports have been made possible through the courtesy of Sir David Rivett, K.C.M.G., F.R.S., and Dr. H. Thompson, Chief of Division of Fisheries, C.S.I.R. The writer is also indebted to Mr. S. Fowler, of the same Department, for facilities in consulting the charts of the area investigated.

DESCRIPTION OF SAMPLES AND THEIR CONTENTS

SAMPLE E 3915

Loc.—East from Babel Island (east of Flinders Island), 65 fathoms. 28 October 1912. *Dried Material*—Grey foraminiferal and shelly ooze, with a greenish tinge. *Coarse Siftings* contain many larger Foraminifera, as *Lenticulina*, *Saracenaria*, *Dentalium*, *Eponides*, *Elphidium*, *Pyrgo*, *Pelosina*, *Haplophragmoides*, *Dorothyia* and *Textularia*. Also abundant tube-building Worms, Polyzoa, Brachiopoda, many Mollusca and Ostracoda.

⁽¹⁾ Biol. Res. "Endeavour," 1, (3), 309-311, 1912. Also Report of the Foraminifera and Ostracoda obtained by the F.I.S. "Endeavour" from the East Coast of Tasmania and off Cape Wiles, South Australia, 3, (1), 1915, 1-51, pls. i-iii.

POLYZOA

Order CHEILOSTOMATA

CABEREA GRANDIS Hincks 1881

Hincks 1881, Ann. Mag. Nat. Hist., (5), 8, 50, pl. iii, fig. 4; MacGillivray, 1895, Trans. Roy. Soc. Vict., 4, 25, pl. iii, fig. 9; Stach, 1935, Proc. Roy. Soc. Vict., 47, (2), n.s., 342, pl. xii, fig. 3.

Common and typical. This species first appears as a fossil in the Lower Miocene of Balcombe Bay, Flinders, the Moorabool Valley, Muddy Creek and the Mitchell River, Bairnsdale; also in the Lower Pliocene (Kalinman) at MacDonald's, Muddy Creek and in the Sorrento Bore at 726 feet. In the living condition it has been found on the cable in Bass Strait, at Western Port, Lakes Entrance, Port Phillip Heads, 22 miles east of Port Jackson at 80 fathoms and at Darnley Island, Torres Strait (10-30 fathoms), as recorded by L. W. Stach.

CABEREA DARWINII Busk 1884

Busk 1884, Chall. Rep. Polyzoa, pt. i, 29, pl. xxxii, fig. 6; MacGillivray (in McCoy), Prod. Zool. Vict., 1887, dec. xiv, 141, pl. cxxxvii, fig. 1-5; *Ibid.*, 1895, Trans. Roy. Soc. Vict., 4, 25, pl. iii, fig. 10, 11.

Rare. The original, living, forms were described from New Zealand. Those from Victoria were from Port Phillip Heads (MacGillivray) and Portland (Maplestone). The fossil specimens are noted from the Tertiary of Muddy Creek near Hamilton.

CELLARIA GRACILIS (Busk 1852)

Salicornaria gracilis Busk 1852, Brit. Mus. Cat., pt. i, 17.

Cellaria gracilis (Busk), MacGillivray, 1895, op. cit., 30, pl. iii, fig. 26.

Common and typical. Fossil specimens have been recorded from the Lower Miocene of Balcombe Bay and Muddy Creek. As a living species MacGillivray notes it from Queenscliff and Sealers' Cove, Wilson's Promontory.

CELLARIA RIGIDA var. VENUSTA MacGillivray 1895

MacGillivray 1895, op. supra cit., 30, pl. iii, fig. 24.

Very abundant. Found fossil in the Lower Miocene of Balcombe Bay, Muddy Creek and Bairnsdale, Victoria. Living, Australia.

CELLARIA TENUIROSTRIS (Busk 1852)

Salicornaria tenuirostris Busk 1852, op. cit., 17.

Cellaria tenuirostris (Busk), MacGillivray (in McCoy), 1880, Prod. Zool., Vict. dec. v, 49, pl. xlix, fig. 3.

Very abundant. This species was collected by Baron v. Mueller from Queensland, Sealers' Cove and Cape Le Febre (det. by MacGillivray).

CONESCIARELLINA BIARMATA (Maplestone 1909)

Bipora biarmata Maplestone, Rec. Aust. Mus., 7, (4), 1909, 268, pl. lxxv, fig. 1 a, b.

Frequent. Previously recorded 22 miles east of Port Jackson in 80 fathoms, H.M.C.S. "Miner."

CONESCIARELLINA PHILIPPINENSIS (Busk 1854)

Lunulites philippinensis Busk, Brit. Mus. Cat., pt. ii, 1854, p. 101.

Bipora philippinensis (Busk), MacGillivray, 1895, Trans. Roy. Soc. Vict., 4, 89, pl. xii, fig. 2.

Occasional specimens. Found fossil in marls of Lower Miocene age at Balcombe Bay and Muddy Creek. Abundant in borings at Lakes Entrance, in beds of the same age (Imray Bore and others). Living off the coast of New South Wales.

CELLEPORA FOSSA (Haswell 1881)

Sphaerophora fossa Haswell, Proc. Linn. Soc. N.S.W., 1881, 5, 42.

Cellepora fossa (Hasw.), MacGillivray, op. cit., 1895, 108, pl. xiv, fig. 8-10.

Rare. Found fossil in most Lower Miocene marls in Victoria. Living around the Australian coast. C. M. Maplestone records it from 22 miles east of Port Jackson (80 fathoms).

Retepora babelensis sp. nov.

Pl. vii, fig. 1-3

Description—Holotype specimen. Zoarium slender, ramose, branching twice. Length, 5.5 mm. Zooecial tubes comparatively long and prominently recurved, as in *R. fissa* and *R. schnapperensis*. Margin of zooecial tubes ragged, often spinous and frequently everted, sometimes with a notch on the lower edge. Diameter of zooecial tubes, 0.19 mm. Zooecial tubes three or four in a more or less oblique series. Avicularia as a minute oval or longitudinal slit. Ovicells with a transverse slit-like opening.

The reverse face shows a rectangular or irregularly hexagonal areolation, as in *Retepora fissa* MacGillivray.

East from Babel Island, 65 fathoms. Rare.

Order **CYCLOSTOMATA**

CRISIA SCALARIS MacGillivray 1895

MacGillivray, op. cit., 1895, 119, pl. xvi, fig. 1.

Common. Hitherto found fossil in the Lower Miocene of Corio Bay, Geelong.

IDMONEA MILNEANA d'Orbigny 1839

d'Orb., Voy. dans l'Amér. Mérid., 1839, pt. v, 20. MacGillivray (in McCoy), 1882, Prod. Zool. Vict., dec. vii, 29, pl. lxviii, fig. 1. *Id.*, 1895, Trans. Roy. Soc. Vict., op. cit., 124, pl. xvii, fig. 1, 2.

Abundant. Fossil records in Victoria are: Lower Miocene of Muddy Creek and Bairnsdale. As a living form this widely distributed species is known from South America, Florida and from Australian waters. All Australian examples, fossils and recent, seem to be typical.

Mecynoecia (Entalophora) dannevigii sp. nov.

(Pl. vii, fig. 4)

Description of Type—Zoarium dendroid, slender, once-branched and slightly curved. Length, 14 mm.; breadth of stipe, 0.4 mm. Zooecia long, tubular and irregularly disposed but sometimes double or nearly adjacent, length of tubes circ. 0.8 mm., diameter 0.22 mm. The wall of the zoarium is somewhat densely punctate. The zooecia are comparatively smooth but for the presence of fine longitudinal grooves. Colour of this recent zoarium is of a delicate plum-brown tint.

Species abundant in this sample.

A closely related species is *Mecynoecia proboscidea* (Milne Edwards) which, by the way, has a cosmopolitan distribution both in time and space. It ranges from the Cretaceous to Recent in America and Europe, whilst it is common in the Lower Miocene of Gippsland. The present specimens are of a more tenuous

structure and have no cortical thickening of the wall. *Entalophora australis* (Busk) of the Lower Miocene of Muddy Creek lives also in Australian seas, but is a distinctly incrassate form with fewer and larger zooecia.

MOLLUSCA

In checking and identifying the names of these, and of the Brachiopoda, I have had the expert assistance of my friend, Mr. C. J. Gabriel. A small proportion of species were recorded by the late Charles Hedley, from "Endeavour" dredgings off Cape Wiles, South Australia.⁽²⁾ These are indicated by an asterisk.

PELECYPODA

Poroleda spatulata Hedley (c.); *Sarepta tellinaeformis* Hedley (v.r.); *Arcoperna recens* Tate (v.r.); *Chlamys famigerator* Iredale (cf. **C. anti-australis* Hedley) (r.); *Myodora* aff. *antipodum* Smith (v.r.); **Venericardia amabilis* (Deshayes) (v.r.); *Myrtaea gabrieli* sp. nov. (r.) (vide infra); *Diplo-donta globulosa* A. Adams (v.r.); **Cardium pulchellum* Gray (ab.); *Macrocallista planatella* (Lamarck) (v.r., juv.).

SCAPHOPODA

Dentalium spp. (fragments, indet.).

GASTEROPODA

**Turritella atkinsoni* Tate and May (c.); **Vermicularia flava* Verco (f.); *Nassarius semigranosus* (Dunker) (f.); *Marginella inconspicua* Sow. (f.); *M. gatliffi* May (v.r.); *Cylichnella protumida* Hedley (v.r.); *Retusa* cf. *cumieri* Crosse and Fischer (v.r.); **Mitra* cf. *stadialis* Hedley (v.r.); *Crassispira* cf. *lacteola* Verco (v.r.); ? *Filodrillia* sp. (v.r.).

BRACHIOPODA

**Camphages jaffaensis* (Blochmann) (r.).

NOTE—The Foraminifera and Ostracoda found in the foregoing and succeeding samples are collected in the Table of Distribution at the end of the Description of the Dredgings and before the Systematic portion of the work dealing with the above-named groups. The abundance of the species in the Samples is indicated in the Table by the relative and not actual number of examples, and elsewhere in the text by small letters, as follows: Very Rare, 1 (v.r.); Rare, 2-3 (r.); Frequent, 4-7 (f.); Common, 8-16 (c.); Very Common, > 16 (v.c.).

SAMPLE E 3916

Loc.—33 miles east by south from Green Cape, north of the Victorian border. From anchor. *Dried Material*—A pale grey, tenacious, calcareous mud. *Finest Washings* contain an abundance of coccoliths, denoting a rich plankton in this area. These coccoliths are of great interest from a palaeontological point of view, for they are structurally similar and of the same dimensions as those found in the Upper Oligocene marls of the Lakes Entrance borings East Gippsland. The richness of this planktonic sediment is a good indication of its suitability as a fishing ground. The remainder of the finest sediments of this sample consists of a few minute shell fragments, some minute Foraminifera (cf. *Discorbis*) and occasional siliceous sponge spicules and stellate spicules of

⁽²⁾ Hedley, C., 1911, Zool. Results, F.I.S. "Endeavour," 1, (1), 91-96. Idem, *ibid.*, 1914, 2, (1), 65-70. See also Iredale, T., 1925, Rec. Austr. Mus., 14, No. 4, 249-270, pls. xli-xliii.

Tunicates. *Medium Fine Siftings* comprise numerous echinoid (salenid) spines, siliceous sponge spicules (cf. *Tethys*), abundant spicules of Tunicates (*Leptoclinum*) and molluscan bivalved shells in the neanic stage (cf. *Lissarca*). The Foraminifera and Ostracoda here belong especially to thin-shelled forms, indicating a pelagic and nektic fauna.

SAMPLE E 3917

Loc.—Eastern edge, Bass Strait. 140 fathoms. 12 December 1912. *Dried Material*—Cream-coloured, fine-grained calcareous mud. *Finest Washings* consist largely of minute crystallised rhombs of calcite, comprising about 40%; also minute molluscan shell-fragments and Foraminifera. A minute quantity of angular quartz grains present. The crystalline calcitic rhombs mentioned are so sharply defined that they suggest dolomite at first sight, but when treated with cold HCl they dissolve almost entirely, leaving a thin trace of ferruginous residue. (See Note below.) *Medium Siftings* contain a fair number of echinoid spines (salenids), frequent valves of Ostracoda and abundant Foraminifera, together with some fragments of Polyzoa. Floatings contain an abundance of *Globigerina*, *Lagena* and *Bolivina*. Amongst the larger fragments, after washing, there is a somewhat decomposed shell, with united valves, of *Cardium pulchellum*, measuring 15 mm. in length and 12 mm. in height; also fragments of *Dentalium* and *Turritella*.

The following POLYZOA also occurred in this sample: *Cellaria rigida* var.; *venusta* MacGill; *Crisia acropora* Busk and *Mecynoecia dannevigii* sp. nov.

NOTE ON THE OCCURRENCE OF CRYSTALS OF CARBONATE OF LIME IN BOTH RECENT AND FOSSIL DEPOSITS, AND THE PROBABLE CONDITIONS UNDER WHICH THEY WERE FORMED

During the past few years, whilst examining Lower Miocene marls from deep borings in East Gippsland, I have repeatedly met with rhombohedral crystals of Calcite in the finer washings.

At first they seemed to be possibly referable to dolomite, on account of the sharpness of their outlines. This doubt was solved, however, by their complete disappearance when treated with cold hydrochloric acid, thus proving them to be calcite crystals.

Whilst examining the recent deposits of the present series from Bass Strait, and particularly that of E 3917, from the eastern edge of Bass Strait, at 140 fathoms, I was struck with the large proportion of these calcitic crystals. They brought to mind the fact of their previous occurrence in the washings of the fossiliferous marls of Lower Miocene age in Gippsland, which sediments were deposited in an ancient trough formerly contiguous with the Southern Ocean.

In both fossil and recent sediments these calcite crystals are of somewhat variable size, but generally much larger in ancient Miocene deposits than in Recent. In the Miocene marls of the Inray Well in East Gippsland, for example, the average diameter is 0.04 mm., whilst from Recent soundings only 0.006 mm. In Miocene examples I have sometimes detected the "nail-head" termination on an occasional prism.

It is somewhat remarkable that there are so few references to the occurrence of free Calcite in descriptions of present-day sediments of the ocean. Murray and Renard⁽³⁾, in their "Deep Sea Deposits," p. 204-5, have recorded such an occurrence from "a highly characteristic Radiolarian ooze," taken at 4,475 fathoms, Sta. 225, lat. 11° 24' N., long. 143° 16' E, between New Guinea and Japan, which contains "some very peculiar white-coloured aggregations composed

(3) Report, "Challenger," Deep Sea Deposits, 1891.

of minute rhombohedral crystals, which when treated with dilute acid decompose with liberation of carbonic acid, but a flocculent residue is left behind, as well as microscopic granules; we are inclined to consider these crystals as calcite or dolomite."

The crystals referred to by Murray and Renard are shown on pl. xxvii, fig. 5, of their Report, where it can be seen that they have exactly half the diameter (0.003 mm.) of the crystals occurring in the present sounding (E 3917).

The minute crystals of hydrated calcium oxalate which Earland found in the deposits from the Weddell Sea ("Scotia" Exped. 1902-4)⁽⁴⁾ cannot easily be mistaken for the present ones, for they are tetragonal bipyramids and show an "envelope" structure of the facets; moreover, they are ten times the diameter.

As regards the probable cause of the deposition of Calcite crystals in marine sediments, this is not far to seek. The normal calcium carbonate, as found in marine shells, is very slightly soluble, and average sea water contains only 0.12 parts per thousand. After remaining in contact with the same substance in a state of exceedingly fine division, the sea water may "take up as much as 0.65 parts per thousand (see "The Ocean" by Sir John Murray, p. 214. Home University Library).

It is known that polar waters contain a minimum of calcic carbonate, hence the thin-shelled faunas of those regions; and that by a rise in the temperature of oceanic waters increased solution is induced. It follows then, that, as in the warmer waters of Bass Strait, where oceanic currents are prevalent, the super-saturated water, meeting with colder flows, will consequently yield up this dissolved calcic carbonate, down to its normal saturation point. Thus the presence of these calcitic rhombs points directly to an area of sedimentation over which currents of varying temperatures are passing.

SAMPLE E 3918

Loc.—"Lat. 37° 21' 20" S., long. 150° 24' 25" E. Foraminiferal sand. 2 October 1912. Washings of mud from Agassiz Trawl. Depth, 505 fathoms. F.I.S. 'Endeavour'." *Dried Material*—Greenish-grey shelly (chiefly foraminiferal), loose, calcareous marl. *Fine Washings* show abundant angular quartz, a large proportion of tetractinellid sponge spicules and numerous coccoliths. Also occasional minute Foraminifera, chiefly *Discorbis*. In the *Medium Washings* Foraminifera and Ostracoda are abundant; tetractinellid sponge spicules occasional; ovoid mud pellets (excreta) in great profusion. *Coarse Siftings* contain, besides abundant ovoid mud pellets and occasional polished quartz grains, the following organisms: FORAMINIFERA—Large forms, especially arenaceous ones. ECHINODERMATA—Spines of spatangoid sea-urchins and of one of the Centrechinoida (purplish red, hollow and with oblique rings of spinules). POLYZOA—Rare; represented chiefly by *Crisia acropora* Busk, *Cellaria gracilis* (Busk) and *C. rigida* MacGill. var. *perampla* Waters. MOLLUSCA—Among these are: *Sarepta obolcella* (Tate); *Nuculana pala* (Hedley); *Lissarca rubricata* Tate; *Philobrya pectinata* Hedley; cf. *Carditella*; *Creseis virgula* Rang; *Clio pyramidata* Linn.; *Limacina inflata* d'Orb.; *Volvula rostrata* (A. Adams). This latter species was recorded by Chas. Hedley from dredgings by the "Thetis" at 63 to 75 fathoms off Port Kembla, New South Wales (Sci. Res. Mem. Aust. Mus., 4, No. 6, 1903, p. 394.

Also PISCES—Otoliths of fish, indet.

⁽⁴⁾Discovery Reports, pt. iv, 1936. Foraminifera. Additional Records, A. Earland. With a Report on some Crystalline Components of the Weddell Sea Deposits, F. A. Bannister and M. H. Hey.

SAMPLE E 3919

Loc.—"Lat. 37° 21' 20" S., long. 150° 24' 25" E. Depth, 505 fathoms. Washing from mud brought up in Agassiz Trawl." *Dried Material*—Greenish-grey fine shelly and foraminiferal mud. *Fine Washings*, rich in plankton (coccoliths, etc.); numerous broken siliceous sponge spicules; a small proportion of fine angular quartz sand and other terrigenous material. Ostracods chiefly in these siftings. *Medium Washings* with a large pelagic foraminiferal fauna. Also numerous ovoid mud pellets. *Coarse Siftings* contain tetractinellid sponge spicules, echinoid spines (spatangoid).

POLYZOA include *Cellaria gracilis* Busk, *Caberea grandis* Hincks, *Conescharrellina philippinensis* (Busk), and *Crisia acropora* Busk. MOLLUSCA—*Nuculana pala* (Hedley), *Poroleda ensicula* (Angas), *Syrnola* spp., *Turritella sinuata* Reeve, *Nassarius tasmanicus* (T. Woods), *Clio* sp. and *Dentalium* sp.

A large proportion of this residue is composed of ovoid mud pellets. There are also some fish otoliths present.

SAMPLE E 3920

Loc.—"Lat. 37° 21' 20" S., long. 150° 29' 25" E. 33 miles east by south from Green Cape, 470 fathoms." Mud with a greenish-grey tinge; also rubbly rock with corals. *Fine Washings*—Containing few coccoliths, broken sponge spicules and some angular quartz sand. Also minute Foraminifera, as *Discorbis*. Floatings with numerous Lagenae. *Medium Siftings*—Rich in echinoid spines (spatangoid), alcyonarian spicules, tetractinellid sponge spicules, as well as Foraminifera and Ostracoda. A fair proportion of the washings, about 10%, consist of ovoid mud pellets. *Coarse Siftings* contain abundant echinoid spines and plates, alcyonarian spicules, polyzoa and small mollusca.

The coarser rubbly element consists largely of coral fragment, *Solenosmilia*.

HEXACORALLA—Abundant fragments of *Solenosmilia variabilis* Duncan occur in the present sample. This deep water coral was not noted by the "Challenger" from the present region, but Professor Moseley records it from various stations in the South Atlantic which seem to have been at one time outposts of the more extensive Antarctic Continent. Thus three localities are given for this coral—Tristan da Cunha at 1,000 fathoms, Prince Edward Island at 310 fathoms and from Ascension at 420 fathoms. Off Green Cape it occurs in great profusion. OCTOCORALLA—*Melitodes* sp. cf. *rugosus*. Numerous fragments.

POLYZOA—*Catenicella* sp.; *Cellaria gracilis* (Busk); *Crisia acropora* Busk. All of these in abundance.

MOLLUSCA

Nucula obliqua Lamarek; *Myrtea gabrieli* sp. nov. (*vide infra*); *Turritella sinuata* Reeve; *Pyrene* sp.; *Nassarius tasmanicus* (T. W.); *Cavolina telemus* (Linn.); cf. *Haminoca* sp.; *Clio pyramidatus* Linn.; *Diacria trispinosa* (Blainville).

Fam. LUCINIDAE

Genus MYRTEA Turton 1822

Myrtea gabrieli sp. nov.

(Pl. ix, fig. 7 a. b)

Description—Type specimen, subquadrate; ventral border deeply convex, meeting the dorsal slope at a decided angle, the latter almost straight. Beak small, prominent, sharply recurved anteriorly, almost subcentral, with a narrow, excavated lunule. Surface of valves inflated, more depressed in the younger stages;

older forms as in the type specimen, depressed anteriorly and posteriorly, having an undulate depression from behind the umbo to the ventral. Concentric ribs close together in the neanic stage, becoming much more widely spaced proportionately in fully grown shells, numbering about 60 in the type.

Height of holotype, 25.5 mm.; length, 32 mm.; thickness of united valves, 12 mm.

Comparisons—Another species, *Myrtea bractea*, has been described and figured by Charles Hedley from Cape Wiles Sta. ("Endeavour"), from 95-100 fathoms.⁽⁵⁾ It differs in the more subcircular outline, the less prominent umbo, which in *M. gabrieli* is almost falciform, the subrounded concentrics (more scaly in our species), and the evenly curved shell-surface, which in *M. gabrieli* is depressed in the anterior and posterior area. From *Myrtea mayi* (Gatliff and Gabriel) the species is essentially different in the absence of radial striae on the shell surface.

Accompanying these shells, from 33 miles east by south from Green Cape at 470 fathoms, are some smaller forms of this genus, which are probably referable to *M. botanica* Hedley. *M. gabrieli* also occurs in E 3915.

PISCES—Otoliths (indet.), common.

SAMPLE E 3921.

Loc.—"Foraminiferal sand. 33 miles east by south from Green Cape. Lat. 37° 21' 20" S., long. 150° 24' 25" E., 505 fathoms. (Washings of mud from Agassiz Trawl.)" Fine and coarse, yellowish-brown foraminiferal mud, with Pteropoda (*Cavolina inflexa* Lesueur) and corals (*Solenosmilia variabilis* Duncan, *Melitodes* and alcyonarian spicules).

SAMPLE E 3922

Loc.—"Foraminiferal sand. 33 miles east by south from Green Cape, 470 fathoms."

NOTE—Although this sample bears the same locality data as E 3920, the material has a very different appearance. It is a coarse rubbly and concretionary mud accumulation, with the larger particles, obtained by washing, stained with iron oxide. This concretionary material is, however, largely calcareous, for when treated with weak hydrochloric acid, it falls to pieces with strong effervescence, leaving a small residue of quartz sand, some siliceous sponge spicules and few ferruginous particles.

With such unpromising material it is surprising to find how numerous are the microzoa, the species of which are fairly common to both samples, E 3920 and E 3922.

The finer siftings, after washing, contain a fair proportion of ovoid mud pellets, echinoid spines, alcyonarian spicules and a few fish otoliths.

SAMPLE E 3923

Sample number only; no locality. A fine, grey, foraminiferal sand. The washings show the same general characters, as regards organisms, as samples east of Babel Island and west of Flinders Island, Tasmania, referred to as E 3915. The present one probably came from east of Babel Island but at a greater depth. It shows a fair proportion of ovoid mud pellets, abundant echinoid spines of both cidaroid and spatangoid types and numerous tetractinellid sponge spicules.

(5) Zool. Results, "Endeavour," 1, (1), 1911, 99, pl. xvii, 5-8.

FORAMINIFERA and OSTRACODA are abundant, the former chiefly represented by the genera *Uvigerina*, *Cassidulina*, *Cibicides*, *Globigerina*, *Orbulina*, *Globorotalia*, *Planispirina* and *Quinqueloculina*; the latter by *Bairdia*, *Cythere* and *Cytherella*; POLYZOA, *Cellaria*, *Crisia* and *Mecynoeica*; MOLLUSCA, *Sarepta obolella* (Tate), *Cerithiopsis* sp., *Rissoa verconiana* Hedley; *Diacria trispinosa* (Blainville), *Clio pyramidatus* Linn., *Cavolina* sp. and *Limacina inflata* d'Orbigny.

TABULATION OF FORAMINIFERA IN THE FAUNULES OF EACH SAMPLE*

Species	Sample Depth	3915 65 fm.	3916 anch.	3917 140	3918 505	3919 505	3920 470	2921 505	3922 470	3923 65
1 <i>Spirillina inaequalis</i> Brady ..		—	—	—	1	—	—	—	—	—
2 <i>Lenticulina clericii</i> (Forn.) ..		—	—	1	—	—	—	—	—	—
3 <i>L.</i> sp. aff. <i>convergens</i> (Born.) ..	2-3	—	—	—	—	—	—	—	—	—
4 <i>L. cultrata</i> (Montf.) ..	8-16	—	—	—	—	1	—	—	—	—
5 <i>L. gibba</i> (d'Orb.) ..	2-3	—	—	—	—	—	—	—	—	—
6 <i>L. rotulata</i> Lam. ..	—	—	—	—	1	—	—	—	1	—
7 <i>L.</i> sp. aff. <i>articulata</i> (Reuss) ..	2-3	—	—	—	—	—	—	—	—	—
8 <i>L.</i> sp. aff. <i>orbicularis</i> (d'Orb.) ..	4-7	—	—	1	1	—	—	—	—	—
9 <i>L.</i> sp. aff. <i>subalata</i> (Reuss) ..	1	—	—	—	—	—	—	—	—	—
10 <i>Planuloria australis</i> sp. nov. ..	—	—	—	—	—	1	—	—	—	—
11 <i>Saracenaria italica</i> Defr. ..	2-3	—	—	1	—	—	—	—	—	—
12 <i>S. navicula</i> (d'Orb.) ..	2-3	—	—	—	—	—	—	—	—	—
13 <i>Astacolus crepidulus</i> (F. & M.) ..	—	—	—	1	—	—	—	—	—	—
14 <i>Marginulina glabra</i> d'Orb. ..	2-3	—	—	1	—	—	1	—	—	1
15 <i>Vaginulina legumen</i> (Linn.) ..	1	—	—	—	1	1	—	—	—	—
16 <i>Dentalina communis</i> d'Orb. ..	1	—	—	—	—	—	—	—	—	—
17 <i>D. fistuca</i> (Schwager) ..	—	—	—	—	—	—	1	—	—	—
18 <i>D.</i> sp. aff. <i>consobrina</i> (d'Orb.) ..	2-3	—	—	—	—	—	—	1	—	—
19 <i>D. soluta</i> Reuss ..	1	—	—	—	—	—	—	—	—	—
20 <i>Nodosaria catenulata</i> Brady ..	1	—	—	—	—	—	1	—	—	—
21 <i>N. calomorpha</i> Reuss ..	—	—	—	—	—	—	—	—	1	—
22 <i>N. pyrula</i> d'Orb. ..	—	—	—	—	—	—	—	—	—	1
23 <i>N. pyrula</i> var. <i>semirugosa</i> d'Orb. ..	—	—	—	1	—	1	—	—	—	—
24 <i>N. vertebralis</i> (Batsch) ..	—	—	—	—	—	—	—	—	2-3	—
25 <i>Lagenonodosaria scalaris</i> (Batsch) ..	>16	—	—	2-3	2-3	4-7	4-7	2-3	2-3	2-3
26 <i>L. scalaris</i> var. <i>separans</i> Br. ..	1	—	—	—	—	—	—	—	—	1
27 <i>L. scalaris</i> var. <i>seminuda</i> nov. ..	—	—	—	—	—	—	—	—	1	—
28 <i>Lagena annectens</i> Bur. & Hol. ..	—	—	—	—	—	1	—	—	—	—
29 <i>L. apiculata</i> (Reuss) ..	—	—	—	—	—	—	—	1	—	—
30 <i>L. clavata</i> d'Orb. ..	—	—	—	1	—	1	—	—	—	—
31 <i>L. costata</i> (Will.) ..	—	—	—	—	—	1	—	—	—	—
32 <i>L. crenata</i> P. & J. ..	—	—	—	—	—	1	1	—	—	—
33 <i>L. distoma</i> P. & J. ..	—	—	—	—	—	—	1	—	—	—
34 <i>L. globosa</i> (Montagu) ..	—	—	—	—	—	1	—	—	—	—
35 <i>L. hexagona</i> (Will.) ..	—	—	—	—	—	1	—	—	—	—
36 <i>L. hispida</i> Reuss ..	—	—	—	—	—	1	—	—	—	—
37 <i>L. lacunata</i> Bur. & Holl. ..	—	—	—	—	—	1	—	—	—	—
38 <i>L. lagenoides</i> (Will.) ..	—	—	—	—	—	—	1	—	—	—
39 <i>L. marginata</i> Walker & Boys ..	—	—	—	1	—	1	—	—	—	—
40 <i>L. melo</i> (d'Orb.) ..	—	—	—	1	—	2-3	4-7	—	1	—
41 <i>L. orbignyana</i> (Seg.) ..	—	—	—	—	—	2-3	1	—	—	—
42 <i>L. striata</i> (d'Orb.) ..	—	—	—	2-3	—	2-3	1	1	—	—
43 <i>L. sulcata</i> (W. & J.) ..	—	—	—	—	—	1	1	—	—	—
44 <i>L. variata</i> Brady ..	—	—	—	1	—	—	—	—	—	—
45 <i>Pseudoglandulina rotundata</i> (Rss.) ..	2-3	—	—	—	—	—	—	—	—	—
46 <i>Guttulina communis</i> (d'Orb.) ..	1	—	—	—	—	—	—	—	—	—
47 <i>G. lactea</i> (Walker & Jacob) ..	—	—	—	—	—	2-3	—	—	—	—
48 <i>G. problema</i> d'Orb. ..	2-3	—	—	2-3	2-3	—	—	—	—	—
49 <i>G. regina</i> (Br. P. & J.) ..	1	—	—	1	1	—	—	—	—	—
50 <i>G. yabei</i> Cushman & Ozawa ..	2-3	—	—	—	—	—	—	—	—	—
51 <i>Globulina gibba</i> d'Orb. var. <i>globosa</i> (Münster) ..	—	—	—	—	—	—	—	—	—	1
52 <i>Glandulina laevigata</i> d'Orb. ..	—	—	—	—	—	2-3	—	—	—	—

* Numbers in Table relative and not actual. See p. 148.

TABULATION OF FORAMINIFERA IN THE FAUNULES OF EACH SAMPLE

Species	Sample Depth	3915 65 fm.	3916 anch.	3917 140	3918 505	3919 505	3920 470	2921 505	3922 470	3923 65
53 <i>Buliminella</i> sp.	1	—	—	—	—	—	—	—	—
54 <i>Bulimina aculeata</i> d'Orb.	—	—	—	—	—	—	—	1	—
55 <i>B. elegans</i> d'Orb.	—	—	—	—	—	8-16	4-7	4-7	—
56 <i>B. sp. aff. marginata</i> d'Orb.	2-3	1	1	—	1	2-3	—	4-7	—
57 <i>B. notozata</i> sp. nov.	—	—	—	2-3	—	—	—	—	—
58 <i>Virgulina subsquamosa</i> Egger	—	—	—	—	4-7	—	—	—	2-3
59 <i>Bolivina alata</i> (Seguenza)	—	4-7	1	—	2-3	4-7	—	2-3	—
60 <i>B. sp. aff. hentyana</i> Chap.	> 16	—	1	2-3	—	—	—	—	—
61 <i>B. beyrichi</i> Reuss	8-16	2-3	1	4-7	1	4-7	4-7	> 16	—
62 <i>B. limbata</i> Brady	—	—	—	—	—	—	1	—	2-3
63 <i>B. punctata</i> d'Orb.	—	—	—	—	1	—	—	—	—
64 <i>B. robusta</i> Brady	—	—	—	—	—	8-16	1	4-7	—
65 <i>Rectobolivina bifrons</i> (Brady)	—	—	1	—	—	—	—	—	1
66 <i>Laxostomum karrerianum</i> (Br.)	1	—	4-7	—	—	—	—	—	—
67 <i>Bifarina fimbriata</i> (Millet)	—	—	—	—	—	—	—	1	—
68 <i>Uvigerina sp. aff. pigmea</i> (d'Orb.)	..	> 16	8-16	1	8-16	8-16	2-3	1	8-16	4-7
69 <i>Trifarina bradyi</i> Cushman	—	—	—	—	—	1	—	—	—
70 <i>Cassidulina crassa</i> d'Orb.	—	—	2-3	—	—	—	—	—	—
71 <i>C. laevigata</i> d'Orb.	—	—	—	—	1	> 16	1	> 16	—
72 <i>C. subglobosa</i> Brady	—	—	—	—	—	2-3	—	1	4-7
73 <i>C. subglobosa</i> var. <i>producta</i> Chap- man and Parr	—	—	—	—	—	1	—	—	1
74 <i>Ellipsolagena schlichti</i> (Silv.)	—	—	—	—	1	2-3	—	—	—
75 <i>Bolivinita quadrilatera</i> (Schw.)	—	—	—	8-16	1	2-3	1	> 16	1
76 <i>B. quadrilatera</i> var. <i>tortilis</i> nov.	—	—	—	—	—	4-7	1	4-7	—
77 <i>Bolivina folium</i> (P. & J.)	—	—	—	2-3	—	—	—	—	—
78 * <i>Parafrondicularia helena</i> sp. nv	..	—	—	—	—	—	—	—	4-7	—
79 <i>Nodogenerina bradyi</i> Cushman	—	—	—	—	—	—	—	1	—
80 <i>N. insolita</i> (Schwager)	—	—	1	—	—	—	—	—	—
81 <i>Patellina corrugata</i> Williams	—	—	—	—	—	—	—	—	1
82 <i>Patellinella inconspicua</i> (Br.)	—	—	—	—	2-3	—	—	—	—
83 <i>Discorbis australis</i> Parr	1	—	—	—	—	—	—	—	—
84 <i>D. bertheloti</i> (d'Orb.)	—	2-3	2-3	2-3	—	2-3	—	—	—
85 <i>D. dimidiatus</i> (J. & P.)	—	—	—	—	2-3	—	—	—	2-3
86 <i>D. disparilis</i> (H. A. & E.)	—	—	1	—	—	—	—	—	—
87 <i>D. opercularis</i> (d'Orb.)	—	2-3	—	—	—	—	—	—	2-3
88 <i>D. orbicularis</i> (Terq.)	—	—	—	1	—	—	—	—	2-3
89 <i>D. rarescens</i> (Brady)	—	—	—	1	—	—	—	—	2-3
90 <i>D. rosacea</i> (d'Orb.)	—	—	—	1	1	—	—	—	—
91 <i>D. rugosa</i> (d'Orb.)	—	—	—	—	—	—	—	—	1
92 <i>D. globularis</i> (d'Orb.)	—	—	—	> 16	—	—	—	—	—
93 <i>Eponides karsteni</i> (Reuss)	—	—	—	—	—	—	—	1	2-3
94 <i>E. repandus</i> (F. & M.)	2-3	—	—	—	—	—	—	—	—
95 <i>Streblus beccarii</i> (Linn.)	8-16	—	2-3	2-3	—	1	—	1	—
96 <i>Notorotalia clathrata</i> (Brady)	—	—	—	—	—	1	—	1	—
97 <i>N. decurrens</i> sp. nov.	2-3	—	1	4-7	—	—	—	—	—
98 <i>Epistomina elegans</i> (d'Orb.)	8-16	—	2-3	2-3	1	—	—	4-7	—
99 <i>Mississippina concentrica</i> (P. & J.)	..	—	—	—	—	2-3	—	—	—	—
100 <i>Canceris auricula</i> (F. & M.)	—	1	—	—	—	—	—	—	—
101 <i>Anomalina colligera</i> Chapm. & Parr	..	1	—	—	—	—	—	—	1	—
102 <i>A. glabrata</i> Cushman	8-16	—	2-3	1	—	2-3	—	1	—
103 <i>A. globulosa</i> Chapm. & Parr	—	—	—	—	—	1	—	1	—
104 <i>A. polymorpha</i> Costa	—	—	1	1	—	—	—	—	1
105 <i>A. sp. aff. rotula</i> d'Orb.	4-7	—	—	—	—	—	—	—	—
106 <i>A. vermiculata</i> (d'Orb.)	4-7	—	—	—	—	1	—	—	—
107 † <i>Planulina biconcava</i> J. & P.	—	—	—	2-3	—	—	—	—	—
108 <i>P. biconcava</i> var. <i>unguiculata</i> (Sidebottom)	—	—	—	—	—	—	—	1	—

* This species was originally placed in *Plectofrondicularia* but is now seen to be referable to the recently described genus *Parafrondicularia* Asano. To avoid much disturbance of proofs, its original position in the text is retained.

† Since made the genotype of *Planulinoides* Parr.

TABULATION OF FORAMINIFERA IN THE FAUNULES OF EACH SAMPLE

Species	Sample Depth	3915 65 fm.	3916 anch.	3917 140	3918 505	3919 505	3920 470	3921 505	3922 470	3923 65
109 <i>P. haliotis</i> (H. A. & E.)	—	—	—	—	—	—	—	—	1	—
110 <i>Cibicides aknerianus</i> (d'Orb.) ..	—	—	—	—	—	—	1	—	—	—
111 <i>C. lobatulus</i> (W. & J.)	—	—	2-3	2-3	2-3	2-3	—	1	4-7	—
112 <i>C. sp. aff. victoriensis</i> Ch., P. & C.	>16	—	—	1	2-3	4-7	1	—	—	—
113 <i>C. pseudoungerianus</i> (Cushman) ..	4-7	—	—	—	8-16	1	—	—	4-7	4-7
114 <i>C. refulgens</i> Montfort	2-3	—	—	—	1	—	—	—	2-3	—
115 <i>C. wuellerstorfi</i> (Schwager)	—	—	2-3	—	—	2-3	4-7	4-7	4-7	4-7
116 <i>Dyocibicides biserialis</i> C. & V. ..	—	—	—	—	—	—	—	—	—	1
117 <i>Amphistegina lessonii</i> d'Orb.	—	—	—	—	—	1	—	—	—	—
118 <i>Chilostomella cushmani</i> sp. nov. ..	—	—	—	2-3	1	—	—	—	—	4-7
119 <i>Pullenia sphaeroides</i> (d'Orb.)	1	1	—	—	—	—	1	—	—	—
120 <i>P. subcarinata</i> (d'Orb.)	—	1	—	—	—	1	2-3	—	—	—
121 <i>Sphaeroidina bulloides</i> d'Orb.	1	—	2-3	—	2-3	1	—	—	1	—
122 <i>Globigerina bulloides</i> d'Orb.	2-3	8-16	4-7	>16	8-16	>16	4-7	>16	>16	4-7
123 <i>G. conglomerata</i> Schwager	—	—	—	2-3	—	—	—	—	—	—
124 <i>G. dutertrei</i> d'Orb.	—	—	—	—	2-3	—	—	—	1	—
125 <i>G. inflata</i> d'Orb.	4-7	8-16	4-7	>16	8-16	>16	>16	>16	>16	>16
126 <i>G. pachyderma</i> (Ehrenberg)	—	1	1	—	—	—	—	—	—	—
127 <i>G. subcretacea</i> Chapm.	—	—	—	2-3	2-3	4-7	—	—	—	8-16
128 <i>Globigerinoides trilobus</i> (Reuss) ..	—	4-7	2-3	—	—	8-16	—	—	1	—
129 <i>Globigerinella oequilateralis</i> (Br.) ..	—	—	—	—	1	—	—	—	—	—
130 <i>Orbulina universa</i> d'Orb.	4-7	—	2-3	>16	>16	>16	>16	8-16	4-7	—
131 <i>Pulleniatina obliquiloculata</i> (P. & J.) ..	—	—	—	8-16	1	—	1	2-3	—	—
132 <i>Sphaeroidinella dehiscens</i> (P. & J.) ..	—	—	—	—	1	—	1	2-3	—	—
133 <i>Globorotalia hirsuta</i> (d'Orb.)	1	—	2-3	8-16	8-16	>16	—	4-7	4-7	—
134 <i>G. scitula</i> (Brady)	—	—	—	—	—	—	—	4-7	1	—
135 <i>G. truncatulinoides</i> (d'Orb.)	—	4-7	2-3	>16	1	—	1	4-7	4-7	—
136 <i>Nonion depressulus</i> (W. & J.)	—	—	2-3	—	2-3	—	—	—	—	—
137 <i>N. graciloupi</i> (d'Orb.)	—	—	—	—	—	4-7	—	—	—	—
138 <i>N. scapha</i> (F. & M.)	—	1	—	2-3	—	—	—	—	—	—
139 <i>N. umbilicatus</i> (Mont.)	2-3	—	—	—	—	—	—	1	—	—
140 <i>Elphidium advenum</i> (Cushman)	8-16	1	1	4-7	2-3	—	—	1	1	—
141 <i>E. crispum</i> (Linné)	—	—	—	—	—	—	—	—	—	1
142 <i>E. imperatrix</i> (Brady)	2-3	—	—	4-7	4-7	—	—	—	—	—
143 <i>E. jenseni</i> (Cushman)	—	—	—	—	—	1	—	—	—	—
144 <i>E. lessonii</i> (d'Orb.)	—	—	2-3	1	—	—	—	4-7	—	—
145 <i>E. macellum</i> (F. & M.)	—	—	—	—	—	2-3	1	2-3	—	—
146 <i>E. poeyanum</i> (d'Orb.)	—	—	—	—	—	2-3	—	—	—	—
147 <i>E. verruculatum</i> (Brady)	>16	—	—	1	—	—	—	1	2-3	—
148 <i>Hyperammmina novaezelandiae</i> H. A. & E.	—	—	—	—	—	2-3	—	—	—	—
149 <i>Saccammmina sphaerica</i> G. O. Sars ..	1	—	—	—	—	—	—	—	—	—
150 <i>Pelosina cylindrica</i> Brady	4-7	—	—	—	—	—	—	—	—	—
151 ? <i>Brachysiphon corbuliformis</i> Chapman	2-3	—	—	—	—	—	—	—	—	—
152 <i>Technitella cf. legumen</i> Norman	1	—	—	—	—	—	—	—	—	—
153 <i>Rhabdammina discreta</i> Brady	—	—	—	4-7	1	>16	1	—	—	—
154 <i>R. irregularis</i> W. B. Carp.	—	—	—	—	—	1	—	—	—	—
155 <i>Cornuspira foliacea</i> (Philippi)	1	—	—	—	—	—	—	—	—	—
156 <i>C. foliacea</i> var. <i>expansa</i> Chap.	—	—	—	—	1	—	—	—	—	—
157 <i>C. lacunosa</i> Brady	1	—	—	—	—	—	—	—	—	—
158 <i>C. striolata</i> Brady	1	—	—	—	—	—	—	—	—	—
159 <i>Ophthalmidium circularis</i> (Ch.)	—	—	—	1	—	—	—	—	—	—
160 <i>Planispirina bucculentata</i> (Brady) ..	2-3	—	—	4-7	4-7	—	—	—	8-16	—
161 <i>P. bucculentata</i> , v. <i>placentiformis</i> Br.	—	—	—	2-3	—	—	—	—	8-16	—
162 <i>Quinqueloculina auberiana</i> d'Orb. ..	—	—	—	—	2-3	—	—	1	2-3	—
163 <i>Q. australis</i> Parr	—	—	—	—	2-3	—	—	—	—	—
164 <i>Q. crassa</i> d'Orb.	1	—	—	—	—	—	—	—	—	—
165 <i>Q. cuevieriana</i> d'Orb.	2-3	—	1	1	—	—	—	—	—	—
166 <i>Q. lamarckiana</i> d'Orb.	4-7	—	1	—	—	2-3	1	1	4-7	—
167 <i>Q. seminulum</i> (Linn.)	—	—	1	—	—	—	—	—	4-7	—
168 <i>Q. vulgaris</i> d'Orb.	8-16	1	—	8-16	8-16	2-3	—	1	2-3	—
169 <i>Spiroloculina canaliculata</i> d'Orb. ..	8-16	—	—	2-3	2-3	—	—	—	4-7	—
170 <i>Sigmoilina latissima</i> sp. nov.	—	—	—	2-3	4-7	—	—	—	—	—

TABULATION OF FORAMINIFERA IN THE FAUNULES OF EACH SAMPLE

Species	Sample Depth	3915 65 fm.	3916 anch.	3917 140	3918 505	3919 505	3920 470	3921 505	3922 470	3923 65
171 <i>S. schlumbergeri</i> A. Silv.	—	—	—	—	—	—	—	1	1
172 <i>Ptychomiliola separans</i> (Brady)	..	2-3	—	—	—	—	—	—	—	—
173 <i>Triloculina chrysostoma</i> (Chap.)	..	—	—	—	—	1	—	—	—	—
174 <i>T. circularis</i> Born.	—	—	—	—	—	—	—	—	4-7
175 <i>T. quadrilateralis</i> d'Orb.	—	—	—	—	—	1	1	1	—
176 <i>T. tricarinata</i> d'Orb.	4-7	—	—	—	1	2-3	—	—	—
177 <i>T. trigonula</i> (Lamarck)	2-3	—	1	—	—	—	—	—	—
178 <i>T. oblonga</i> (Montagu)	1	1	—	1	—	—	—	1	—
179 <i>Pyrgo comata</i> (Brady)	—	—	—	—	1	—	—	—	—
180 <i>P. elongata</i> (d'Orb.)	—	—	—	—	1	1	1	—	1
181 <i>P. fornasinii</i> Chap. & Parr	4-7	—	—	1	—	—	—	—	—
182 <i>P. sarsi</i> (Schlumb.)	—	—	—	1	—	—	—	1	2-3
183 <i>P. vespertilio</i> (Schlumb.)	—	—	—	—	1	—	—	—	—
184 <i>Pyrgoella sphaera</i> (d'Orb.)	4-7	—	—	4-7	—	1	—	—	1
185 <i>Biloculinella globulus</i> (Born.)	4-7	1	—	—	1	—	—	—	—
186 <i>Haplophragmoides emaciatus</i> (Br.)	..	—	—	—	1	—	—	—	—	—
187 <i>H. grandiformis</i> Cushman	8-16	—	—	1	—	—	—	—	—
188 <i>Recurvoides contortus</i> Earland	—	—	—	—	—	—	—	2-3	—
189 <i>Ammobaculites agglutinans</i> (d'O.)	..	—	—	—	—	1	—	—	—	—
190 <i>Reophax dentaliniformis</i> Brady	—	—	—	—	2-3	—	—	—	—
191 <i>R. distans</i> v. <i>pseudodistans</i> Cush.	—	—	—	—	—	1	—	—	—
192 <i>R. scorpiurus</i> Montfort	—	—	—	2-3	—	—	—	—	—
193 <i>Textularia conica</i> (d'Orb.)	8-16	—	—	—	—	—	—	—	—
194 <i>T. corrugata</i> H. A. & E.	4-7	—	—	—	—	—	—	—	—
195 <i>T. pseudogramen</i> Chapm. & Parr	8-16	—	—	—	1	—	—	—	1
196 <i>T. sagittula</i> Deir.	2-3	—	1	2-3	2-3	—	—	—	4-7
197 <i>Trochammina planoconvexa</i> Ch. & P.	..	—	—	—	—	—	—	—	1	—
198 <i>Clavulina serventyi</i> Ch. & Parr	2-3	—	2-3	—	—	—	—	—	—
199 <i>Dorothyia arenata</i> Cushman	8-16	—	—	—	1	—	—	—	—
200 <i>D. scabra</i> (Brady)	2-3	—	—	—	—	—	—	—	—
201 <i>Listerella</i> sp.	1	—	—	—	—	—	—	—	—
202 <i>Gaudryina robusta</i> Cushman	1	—	—	—	—	—	—	1	—
203 <i>G. triangularis</i> Cushman	4-7	—	—	—	—	—	—	—	—

TABULATION OF OSTRACODA IN THE FAUNULES OF EACH SAMPLE

Species	Sample Depth	3915 65 fm.	3916 anch.	3917 140	3918 505	3919 505	3920 470	3921 505	3922 470	3923 65
1 <i>Pontocypris bradyi</i> nom. mut.	—	1	1	2-3	—	1	—	—	—
2 <i>P. attenuata</i> G. S. Brady	—	—	—	—	2-3	—	—	—	—
3 <i>P. simplex</i> G. S. Brady	—	—	—	2-3	1	—	—	—	1
4 <i>P. subreniformis</i> G. S. Brady	1	1	—	1	—	—	—	—	—
5 <i>Argilloecia badia</i> G. S. Brady	1	1	—	1	—	—	—	—	—
6 <i>Macrocypris decora</i> (G. S. B.)	4-7	1	1	2-3	1	—	—	—	1
7 <i>M. setigera</i> G. S. Brady	4-7	—	1	—	—	—	—	—	1
8 <i>Bythocypris reniformis</i> G. S. B.	—	—	—	1	1	1	—	—	—
9 <i>Bairdia acanthigera</i> G. S. Brady	—	—	2-3	2-3	—	—	—	—	—
10 <i>B. amygdaloides</i> G. S. Brady	8-16	1	4-7	2-3	1	—	1	1	>16
11 <i>B. australis</i> Chapman	—	—	1	1	1	1	—	—	4-7
12 <i>B. cf. expansa</i> G. S. Brady	—	—	—	—	—	1	—	—	—
13 <i>B. foveolata</i> G. S. Brady	1	—	—	—	—	—	—	—	—
14 <i>B. fusca</i> G. S. Brady	—	—	2-3	—	—	—	—	—	—
15 <i>B. minima</i> G. S. Brady	—	—	1	—	4-7	—	—	—	—
16 <i>Cythere acerosella</i> sp. nov.	—	—	1	—	—	1	—	—	1
17 <i>C. canaliculata</i> Reuss	—	—	—	—	—	—	1	1	—
18 <i>C. crispata</i> G. S. Brady	—	—	—	—	—	1	—	—	1
19 <i>C. cristatella</i> G. S. Brady	2-3	—	—	—	—	—	—	—	—
20 <i>C. cytheropteroides</i> G. S. Brady	2-3	—	—	—	—	—	—	—	—
21 <i>C. dasyderma</i> G. S. Brady	—	—	—	1	—	—	—	—	—
22 <i>C. demissa</i> G. S. Brady	—	—	—	1	—	—	—	1	—
23 <i>C. dictyon</i> G. S. Brady	1	—	—	2-3	—	—	—	1	—
24 <i>C. exilis</i> G. S. Brady	—	—	—	—	—	—	—	1	—
25 <i>C. falklandi</i> G. S. Brady	—	—	—	—	2-3	—	—	—	—
26 <i>C. foveolata</i> G. S. Brady	—	—	2-3	—	1	—	—	—	—
27 <i>C. goujoni</i> G. S. Brady	—	—	—	—	1	—	—	1	—

TABULATION OF OSTRACODA IN THE FAUNULES OF EACH SAMPLE

Species	Sample Depth	3915 65 fm.	3916 anch.	3917 140	3918 505	3919 505	3920 470	2921 505	3922 470	3923 65
28 <i>C. inconspicua</i> G. S. Brady	—	—	—	2-3	—	—	—	—	—
29 <i>C. irrorata</i> G. S. Brady	—	—	—	—	1	—	—	—	—
30 <i>C. militaris</i> (G. S. Brady)	—	1	—	—	—	—	—	—	—
31 <i>C. normani</i> G. S. Brady	1	—	—	—	—	—	—	—	—
32 <i>C. obtusolata</i> G. S. B. v. <i>tenuis</i> nov.	..	—	—	—	—	2-3	—	2-3	—	2-3
33 <i>C. ovalis</i> G. S. Brady	—	—	—	1	—	—	—	—	—
34 <i>C. postcaudispinosa</i> sp. nov.	..	—	—	1	—	—	—	—	—	—
35 <i>C. rastrumarginata</i> G. S. Brady	—	—	1	—	—	1	—	2-3	—
36 <i>C. scutigera</i> G. S. Brady	—	—	—	—	—	—	—	—	2-3
37 <i>C. subrufa</i> G. S. Brady	—	—	—	—	—	—	—	—	1
38 <i>C. tetrica</i> G. S. Brady	—	—	—	—	—	1	—	—	—
39 <i>Eucythere declivis</i> (Norman)	—	—	—	1	1	—	—	—	—
40 <i>Krithe producta</i> G. S. Brady	4-7	—	—	1	—	—	—	—	—
41 <i>Loxoconcha australis</i> G. S. Brady	—	—	—	2-3	1	1	1	4-7	1
42 <i>L. avellana</i> G. S. Brady	—	—	—	2-3	—	—	—	2-3	—
43 <i>Xestoleberis curta</i> (G. S. Brady)	2-3	—	—	—	—	1	—	—	—
44 <i>X. davidiana</i> Chapman	—	1	2-3	—	—	—	—	—	—
45 <i>X. margaritca</i> (G. S. Brady)	—	—	—	—	—	—	—	—	1
46 <i>X. nana</i> G. S. Brady	—	—	—	—	—	—	—	—	2-3
47 <i>X. polita</i> G. S. Brady	—	—	—	—	—	—	—	—	1
48 <i>X. setigera</i> G. S. Brady	—	—	—	1	—	—	—	—	—
49 <i>X. variegata</i> G. S. Brady	—	—	—	—	—	—	—	—	1
50 <i>Cytherura costellata</i> G. S. B.	—	—	—	1	—	—	—	1	—
51 <i>C. cryptifera</i> G. S. Brady	—	—	—	1	—	—	—	—	—
52 <i>Cytheropteron assimile</i> G. S. B.	—	—	—	—	1	1	—	—	—
53 <i>C. dannevigii</i> Chapman	—	—	1	—	—	—	—	—	—
54 <i>C. hedleyi</i> sp. nov.	1	—	—	—	—	—	—	—	—
55 <i>Bythocythere arenacea</i> G. S. B.	—	—	—	1	—	—	1	—	—
56 <i>Pseudocythere caudata</i> G. O. S.	—	—	1	—	—	—	—	1	—
57 <i>P. fuegiensis</i> G. S. Brady	—	—	—	1	—	—	—	—	—
58 <i>Cytherella lata</i> G. S. Brady	—	—	—	—	—	—	—	1	—
59 <i>C. polita</i> G. S. Brady	—	—	2-3	—	—	—	—	1	—
60 <i>C. pulchra</i> G. S. Brady	—	1	2-3	1	—	—	—	—	—
61 <i>C. punctata</i> G. S. Brady	1	1	—	2-3	—	1	—	1	>16
62 <i>C. semitalis</i> G. S. Brady	—	—	—	1	—	—	—	—	—
63 <i>Cytherelloidea auris</i> sp. nov.	—	—	—	—	—	—	—	1	—

SYSTEMATIC
FORAMINIFERA

Superfam. SPIRILLINOIDEA

Fam. SPIRILLINIDAE

Genus SPIRILLINA Ehrenberg 1843

1 SPIRILLINA INAEQUALIS Brady 1879

Brady 1879, 278, pl. viii, fig. 25 *a, b*, 1884, 631, pl. lxxxv, fig. 8-11; Chapman, 1915, 28.

A well-known Pacific species. Previously noted from Sta. 36, east of Tasmania, 777 fathoms.

E 3918, v.r.

Fam. NODOSARIIDAE

Genus LENTICULINA Lamarck 1804

2 LENTICULINA CLERICII (Fornasini 1895)

Cristellaria clericii Fornasini 1895, text fig. 1901, 65, fig. 17.

This form belongs to the group of *L. vortex* (d'Orb.), *serpens* (Seguenza) and *orbicularis* (d'Orb.), in which the sutural lines are extremely angulate. Typical of South Pacific areas. This hitherto fossil form was described from a late Tertiary deposit (? Pliocene) of Italy.

E 3917, v.r.

3. LENTICULINA sp. aff. CONVERGENS (Bornemann 1855)

Cristellaria convergens Bornemann 1855, 337, pl. xiii, fig. 16, 17

The original species, with which the present is doubtfully identified, came from the Oligocene deposits of Hermsdorf, Germany. The "Challenger" examples came from the North and South Pacific (Brady 1884). E 3915, r.

4 LENTICULINA CULTRATA (Montfort 1808)

Robulus cultratus Montfort 1808, 215.

Cristellaria cultrata (Montf.), Brady, 1884, 550, pl. lxx, fig. 4-8.

A widely distributed species, both fossil and recent. The "Challenger" obtained it from the West Indies and Fiji. I have previously noted it from "Endeavour" material, east of Tasmania, 777 fathoms.

E 3915, c; E 3919, v.r. (deformed).

5 LENTICULINA GIBBA (d'Orbigny 1839)

Cristellaria gibba d'Orbigny 1839, 40, pl. vii, fig. 20, 21.

The "Challenger" figured specimens came from the West Indies. It is widely distributed both in fossil deposits and recent dredgings. E 3915, r.

6 LENTICULINA ROTUNDATA Lamarck 1804

Lamarck 1804, 183, No. 3; 1806, pl. lxii, fig. 11.

The "Challenger" figured specimens came from the West Indies. It is a widely distributed form. Previously noted by me from 40 miles south of Cape Wiles, 100 fathoms ("Endeavour").

E 3918, v.r.; E 3922, v.r.

7 LENTICULINA sp. aff. ARTICULATA (Reuss 1864)

Robulina articulata Reuss 1864, 53, pl. v, fig. 62 a, b, 63 a, b.

Recent forms, similar to the present material, found in southern waters, do not appear to be referable to the fossil species figured by Reuss from the *Septaria*-clays of Germany. The recent form is typical of the Australian region. Under the name of *Cristellaria articulata* I have noted it from 40 miles south of Cape Wiles, 100 fathoms.

E 3915, r.

8 LENTICULINA sp. aff. ORBICULARIS (d'Orb. 1826)

Robulina orbicularis d'Orbigny 1826, 288, pl. xv, fig. 8, 9.

I have previously recorded this form as *Cristellaria orbicularis* d'Orb. from 40 miles south of Cape Wiles, 100 fathoms. E 3915, f; E 3917, v.r.; E 3918, v.r.

9 LENTICULINA sp. aff. SUBALATA (Reuss 1854)

Cristellaria subalata Reuss, 1854, 68, pl. xxv, fig. 13.

This, in common with many other recent forms, cannot be specifically identified with the Cretaceous and Tertiary fossils of Europe.

E 3915, v.r.

Genus PLANULARIA Defrance 1824

10 *Planularia australis* sp. nov.

(Pl. ix, fig. 1)

Cristellaria tricarina Chapman (non Reuss), 1915, 24, pl. i, fig. 6.

Description—Test subovate to elongate-arcuate. Surface complanate; dorsal edge thickened but not sharply tricarinate as in Reuss' figures. Seven arcuate chambers in type, forming a widely open spiral. A small subspherical proloculus at the origin of coil. Aperture dentate. Length of test, 0.7 mm.; greatest breadth, 0.38 mm.; thickness of test, 0.08 mm.

Comparisons—Differs from "*Cristellaria*" *tricarinella* Reuss and from *C. complanata* Reuss in having the sutures flush with the surface. Brady's specimens figured in the "Challenger" Report appear to be intermediate between the present and Reuss' form in showing some carination of the dorsal border. As *Cristellaria tricarinella*, variations of this form have been recorded from the Philippines and from the west coast of New Zealand. E 3919, v.r.

Genus SARACENARIA Defrance 1824

11 SARACENARIA ITALICA Defrance 1824

Defrance 1824, 177; Blainville, 1825, 370, pl. v, fig. 6.

The "Challenger" figured examples came from the West Indies and Fiji. The occurrence of this species is usually indicative of the presence of warm water. E 3915, r.; E 3917, v.r.

12 SARACENARIA NAVICULA (d'Orb. 1840)

Cristellaria navicula d'Orb. 1840, 27, pl. ii, fig. 19.

A broad variation of the preceding species. It is typically a Cretaceous form, but seems to range, without any great difference, into recent times. E 3915, r.

Genus ASTACOLUS Montfort 1808

13 ASTACOLUS CREPIDULA (Fichtel and Moll 1798)

Nautilus crepidula Fichtel and Moll 1798, 107, pl. xix, *g-i*.

A widely distributed species, with many intergradations. Typical forms were found by the "Challenger" off the Ki Islands, Japan; at the Azores, the West Indies and the Bermudas. E 3917, v.r.

Genus MARGINULINA d'Orbigny 1826

14 MARGINULINA GLABRA d'Orbigny 1826

d'Orbigny 1826, Modèles, 55; Parker, Jones and Brady, 1865, 27, pl. i, fig. 36.

A common form, of wide distribution.

E 3915, r.; E 3917, v.r.; E 3920, v.r.; E 3923, v.r.

Genus VAGINULINA d'Orbigny 1826

15 VAGINULINA LEGUMEN (Linn. 1758)

Brady, 1884, 530, pl. lxvi, fig. 13-15.

A cosmopolitan species. Also found in the Philippines.

E 3915, v.r.; E 3918, v.r.; E 3919, v.r.

Genus DENTALINA d'Orbigny 1826

16 DENTALINA COMMUNIS d'Orbigny 1826

d'Orbigny 1826, 254, No. 35.

An arcuate form with oblique chambers. It agrees with those found by Brady, whose "Challenger" specimens came from the West Indies, Bermudas and Fiji. E 3915, v.r.

17 DENTALINA FISTUCA (Schwager 1866)

Nodosaria fistuca Schwager 1866, 216, pl. v, fig. 36, 37.

This finely hirsute form, having long ovoid chambers, was originally described from the Neogene fossil deposits of Kar Nikobar, south of the Andaman Islands. E 3920, v.r.

18 DENTALINA sp. aff. CONSOBRINA (d'Orb. 1846)

d'Orbigny 1846, 46, pl. ii, fig. 1-3.

Dentalina consobrina of d'Orbigny is chiefly known as a Tertiary fossil, and was originally described from the Lower Miocene of the Vienna Basin. The recent species, from southern waters, is of a more regular and evenly chambered form, and occurs in the Antarctic amongst other localities.

E 3915, r.; E 3921, v.r.

19 DENTALINA SOLUTA Reuss 1851

Reuss 1851, 60, pl. iii, fig. 4.

Nodosaria (*D.*) *soluta* Brady, 1884, 503, pl. lxii, fig. 13-16.

This remarkably persistent form in time ranges from the Cretaceous to the present.

E 3915, v.r.

Genus NODOSARIA Lamarck 1812

20 NODOSARIA CATENULATA Brady 1884

Brady 1884, 515, pl. lxiii, fig. 32-34.

This species has an interesting distribution as regards the present soundings, for Brady records it from the Philippines at 95 fathoms and off Raine Island, Torres Strait, at 155 fathoms.

E 3915, v.r.; E 3920, v.r.

21 NODOSARIA CALOMORPHA Reuss 1865

Reuss 1865, 129, pl. i, fig. 15-19; Brady, 1884, 497, pl. lxi, fig. 23-27; Chapman and Parr, 1937, 61.

The southern occurrences of this species, often at great depths, comprise the Falkland Islands, and Kerguelen Island (Brady) and also South Georgia (Earland), and in Bass Strait (Chapman and Parr). Brady also refers to it as from the Ki Islands and off the Philippines. Reuss' specimens were from the Oligocene of Pietzpuhl, North Germany.

E 3922, v.r.

22 NODOSARIA PYRULA d'Orbigny 1826

d'Orbigny 1826, 253, No. 13. Brady, 1884, 491, pl. lxii, fig. 10-12.

This is a common species in the Philippines and it has also been obtained off the Ki Islands. It is a widely distributed species elsewhere. I have previously recorded it from "Endeavour" material from east of Tasmania, 777 fathoms.

E 3923, v.r.

23 NODOSARIA PYRULA var. SEMIRUGOSA d'Orbigny 1846

Nodosaria semirugosa d'Orb. 1846, 34, pl. i, fig. 29-23; Millett, 1902, 515, pl. xi, fig. 5.

Nodosaria costulata Brady 1884, 515, pl. lxiii, fig. 23-27.

Nodosaria pyrula var. *semirugosa* d'Orb., Cushman, 1913, 50, pl. xxvi, fig. 4-8.

This species is found from the Cretaceous to Recent. It has been dredged from the Philippines, the Malay Archipelago and off Japan, as well as at various Stations in the West Indies.

E 3917, v.r.; E 3919, v.r.

24 NODOSARIA VERTEBRALIS (Batsch 1791)

Nautilus (*Orthoceras*) *vertebralis* Batsch 1791, 3, No. 6, pl. ii, fig. 6 a, b.

Nodosaria vertebralis (Batsch) Brady, 1884, 514, pl. lxiii, fig. 35; pl. lxiv, fig. 11-14.

Amongst other localities, this species occurs in the North Pacific, off the Hawaiian Islands, and from the east coast of New Zealand.

E 3922, r.

Genus LAGENONODOSARIA Silvestri 1900

25 LAGENONODOSARIA SCALARIS (Batsch 1791)

Nautilus (Orthoceras) scalaris Batsch 1791, No. 4, pl. ii, fig. a, c.

Nodosaria scalaris (Batsch). Cushman, 1913, 58, pl. xxiv, fig. 7.

This species occurs as a common fossil in the Neogene of Europe. It is found living off the coast of Australia, on the east coast of New Zealand, the Philippines, Guam, Japan and the Hawaiian Islands. It is one of the most abundant forms in the present series; previously recorded from "Endeavour" material (1915), from 40 miles south of Cape Wiles, 100 fathoms.

E 3915, v.c.; E 3917, r.; E 3918, r.; E 3919, f.;
E 3920, f.; E 3921, r.; E 3922, r.; E 3923, r.

26 LAGENONODOSARIA SCALARIS (Batsch) var. SEPARANS (Brady 1884)

Nodosaria scalaris var. *separans* Brady 1884, 510, pl. lxiv, fig. 16-19.

Hitherto from the west coast of New Zealand (*vide* Nuttall's Locality List of Brady's figured specimens of the "Challenger" Report in Annals and Mag. Nat. Hist., (9), 19, 209-241, 1927—an invaluable adjunct to Brady's work).

E 3915, v.r.; E 3923, v.r.

27 *Lagenonodosaria scalaris* (Batsch) var. *seminuda* nov.

(Pl. ix, fig. 2)

Description—Test stoutly built, consisting of three sub-globular chambers, well inflated and even more so than in the type species; aperture round at the extremity of the extended tube, the surface of which is distinctly annulated. Shell surface polished, relieved by a few indistinct linear costae. Length, 0.59 mm.; greatest width of last chamber, 0.3 mm.

E 3922, v.r.

Genus LAGENA Walker and Jacob 1798

28 LAGENA ANNECTENS Burrows and Holland 1895

Burrows and Holland (in Jones, Parker and Brady) 1895, 203, pl. vii, fig. 11 a, b.

This fossil *Lagena* from the English Crag (Pliocene) has more recently been recorded as an Antarctic (Kerguelen) and New Zealand species. It also occurs off the coast of New South Wales. As a fossil it has also been found in the Lower Miocene of Batesford, near Geelong, Victoria.

E 3919, v.r.

29 LAGENA APICULATA (Reuss 1850)

Oolina apiculata Reuss 1850, 22, pl. i, fig. 1.

A cosmopolitan species both as to locality and depth. It is geologically an ancient type, dating from the Lias.

E 3921, v.r.

30 LAGENA CLAVATA (d'Orbigny 1846)

Oolina clavata d'Orbigny 1846, 24, pl. i, fig. 2, 3.

Lagena clavata Brady, 1884, 456; Cushman, 1913, 9, pl. ii, fig. 3.

A bipolar form and otherwise extensively distributed. Cushman records it from the North Pacific, near Guam, at 234 fathoms, and from several Stations in the Philippines.

E 3917, v.r.; E 3919, v.r.

31 LAGENA COSTATA (Williamson 1858)

Entosolenia costata Williamson 1858, 9, pl. i, fig. 18.

Lagena costata (Williamson) Sidebottom, 1912, 388, pl. xv, fig. 16-21.

This species has been recorded by Sidebottom from the South-west Pacific.
E 3919, v.r.

32 LAGENA CRENATA Parker and Jones 1865

Parker and Jones 1865², 420, xviii, fig. 4 *a, b*; Brady, 1884, 467, lvii, fig. 15, 21.

Besides occurring at several British localities, this comparatively rare form was noted by the "Challenger" from the Cape of Good Hope, 15-20 fathoms, from Australian shore-sands, off Moncoeur Island, Bass Strait, 38 fathoms, and at three localities in the South Pacific at 2,325-2,425 fathoms. Heron-Allen and Earland obtained it from the Antarctic (Terra Nova Expedition).

E 3919, v.r.; E 3920, v.r.

33 LAGENA DISTOMA Parker and Jones 1864

Parker and Jones (Ms. in Brady) 1864, 467, pl. xlviii, fig. 6.

Distributed in all seas and at varying depths. The figured specimens from the "Challenger" collection (pl. lviii, fig. 12-15) came from Kerguelen Island (*vide* Nuttall).

E 3920, v.r.

34 LAGENA GLOBOSA (Montagu 1804)

Vermiculum globosum Montagu 1804 (in Brown, Ill. Rec. Conch.), 144, pl. lvi, fig. 37, 40.

Widely distributed in all seas. The figure 2 on pl. lvi of the "Challenger" Report came from Bass Strait (*vide* Nuttall).

E 3919, v.r.

35 LAGENA HEXAGONA (Williamson 1848)

Entosolenia squamosa var. *hexagona* Williamson 1848, 20, pl. ii, fig. 23.

Lagena hexagona Brady 1884, 72, pl. lviii, fig. 32, 33.

Widely distributed in present seas. Common in various Tertiary deposits of Europe. Has been recorded generally from the Antarctic.

E 3919, v.r.

36 LAGENA HISPIDA Reuss 1858

Reuss 1858, 434. *Idem*, 1862, 335, pl. iv, fig. 77-79.

Brady figures this species from Torres Strait and off Japan. It has an extensive geographical distribution and a wide geological range, from Lias to Recent.

E 3919, v.r.

37 LAGENA LACUNATA Burrows and Holland 1895

Lagena castrensis Brady (non Schwager) 1884, 485, pl. lx, fig. 1, 2.

Lagena lacunata Burrows and Holland 1895, 205, pl. vii, fig. 12 *a, b*; Chapman and Parr, 1926, 378, pl. xvii, fig. 18.

The "Challenger" records (under *L. castrensis*) are: Moncoeur Island, Bass Strait, 38 fathoms; Raine Island, Torres Strait, 155 fathoms; Amboyna, 15-20 fathoms; south of Japan, 345 fathoms. Heron-Allen and Earland noted it from North Cape, New Zealand (Terra Nova Expedition). Chapman and Parr found fossil specimens of Lower Miocene age in the Altona Bay Coal shaft, Port Phillip. The original type was recorded as fossil in the English Crag (Pliocene).

Lagena lacunata was previously recorded by me from "Endeavour" material east of Tasmania at 777 fathoms.

E 3919, v.r.

38 LAGENA LAGENOIDES (Williamson 1858)

Entosolenia marginata var. *lagenoides* Williamson 1858, 11, pl. i, fig. 25, 26.

Lagena lagenoides (Will.), Brady, 1884, 479, pl. lx, fig. 6, 7, 9, 12-14.

Previously recorded by me from "Endeavour" material east of Tasmania, 1,122 fathoms.

E 3920, v.r.

39 LAGENA MARGINATA (Walker and Boys 1784)

Serpula (*Lagena*) *marginata* Walker and Boys 1784, 2, pl. i, fig. 7.

Lagena marginata, Brady 1884, 476, pl. lix, fig. 21-23.

This species has a widely extended range, "almost to the Antarctic Ice-Barrier" (Brady).

E 3917, v.r.; E 3919, v.r.

40 LAGENA MELO (d'Orbigny 1839)

Oolina melo d'Orbigny 1839³, 20, pl. v, fig. 9.

Lagena melo, Jones, Parker and Brady, 1866, 38, pl. i, fig. 35.

Heron-Allen and Earland record this species from east of North Cape, New Zealand.

E 3917, v.r.; E 3919, r.; E 3920, f.; E 3922, v.r.

41 LAGENA ORBIGNYANA (Seguenza 1862)

Fissurina orbignyana Seguenza 1862, 66, pl. ii, fig. 25, 26.

Lagena orbignyana, Brady, 1884, 484, pl. lix, fig. 1, 18, 24-26.

Distribution world-wide and geologically co-extensive with the Tertiaries. Earland records this species from South Georgia, and Cushman from New Zealand. Previously recorded from "Endeavour" material, 40 miles south of Cape Wiles, 100 fathoms.

E 3919, r.; E 3920, v.r.

42 LAGENA STRIATA (d'Orbigny 1839)

Oolina striata d'Orbigny 1839, 21, pl. v, fig. 12.

Lagena striata, Brady 1884, 460, pl. lvii, fig. 22, 24, 28, 29.

Species of wide distribution. Previous records from "Endeavour" material (1915) are: east of Tasmania at 777 fathoms, and 40 miles south of Cape Wiles, 100 fathoms.

E 3917, r.; E 3919, r.; E 3920, v.r.; E 3921, v.r.

43 LAGENA SULCATA (Walker and Jacob 1798)

Serpula (*Lagena*) *sulcata* W. and J. 1798, 634, pl. xiv, fig. 5.

Lagena sulcata, Brady 1884, 462, pl. lvii, fig. 23, 26, 33, 34.

Several examples figured in the "Challenger" Report came from Southern Seas, as, for instance, from Kerguelen Island (pl. lvii, fig. 23, 25, 34). A previous record from "Endeavour" material is 40 miles south of Cape Wiles, 100 fathoms.

E 3919, v.r.; E 3920, v.r.

44 LAGENA VARIATA Brady 1884

Brady 1884, 461, pl. lxi, fig. 1; Chapman, 1907, 128, pl. ix, fig. 8.

A rare form, according to Brady. The only localities appear to be Bass Strait, 38 fathoms, Beaumaris (Chapman) and the Malay Archipelago.

E 3916, v.r.

Genus PSEUDOGLANDULINA Cushman 1929

45 PSEUDOGLANDULINA ROTUNDATA (Reuss 1850)

Glandulina rotundata Reuss 1850, 366, pl. xlvi, fig. 2

Nodosaria (*Glandulina*) *rotundata* Brady 1884, 491, pl. lxi, fig. 17-19; Chapman, 1916¹, 32, pl. iii, fig. 20 a, b.

Recorded from upthrust muds, slopes of Mount Erebus (Chapman) and from Mawson's Antarctic material (Chapman and Parr, 1911-14). Previously recorded by me from "Endeavour" soundings, 40 miles south of Cape Wiles, 100 fathoms. E 3915, r.

Fam. POLYMORPHIINIDAE

Genus GUTTULINA d'Orbigny 1826

46 GUTTULINA COMMUNIS d'Orbigny 1826

Polymorphina (*Guttulina*) *communis* d'Orbigny 1826, 266, pl. xii, fig. 1-4.
Polymorphina communis, Brady 1884, 568, pl. lxxii, fig. 19.

A well-grown example of this species was found close to the Antarctic Ice Barrier, in 1,810 fathoms (Chapman and Parr, 1937). Also found generally in moderately shallow water off the coast of New Zealand ("Terra Nova"). Previous records from "Endeavour" material as "*Polymorphina communis*," from 40 miles south of Cape Wiles, 100 fathoms. E 3915, v.r.

47 GUTTULINA LACTEA (Walker and Jacob 1798)

Serpula lactea Walker and Jacob 1798, 634, pl. xiv, fig. 4.
Polymorphina lactea, Williamson 1858, 70, pl. vi, fig. 145-152.
Guttulina lactea, Cushman and Ozawa 1936, 43, pl. x, fig. 1-4.

A common species round the British Isles; also found in shallow to moderately deep water in the West Indies, the Tortugas (Florida), the coast of Japan and the Philippines. It has also been recorded in shore sands of the Victorian coast. E 3919, r.

48 GUTTULINA PROBLEMA d'Orbigny 1826

Guttulina problema d'Orbigny 1826, 266, No. 14.
Polymorphina problema, Brady 1884, 568, pl. lxxii, fig. 20; pl. lxxiii, fig. 1.

Both of Brady's figured specimens came from Bass Strait (*vide* Nuttall). Recorded by Parr and Collins from San Remo, Victoria, and from Oyster Bay, and east of Cape Pillar, Tasmania, at 100 fathoms.

E 3915, r.; E 3917, r.; E 3918, r.

49 GUTTULINA REGINA (Brady, Parker and Jones 1870)

Polymorphina regina B., P. and J. 1870, 241, pl. xli, fig. 32 a, b; Chapman, 1907, 132, pl. x, fig. 4.
Guttulina regina, Cushman and Ozawa 1936, 34, pl. vi, fig. 1, 2; Parr and Collins 1937, 193, pl. xii, fig. 5; text fig. 1-7.

Localities in Victoria are Port Lonsdale and Barwon Heads; in New South Wales, Port Jackson; also from Queensland, Tasmania and West Australia, Great Australian Bight (Parr and Collins). "Challenger" examples were obtained from Raine Island, Torres Strait, 155 fathoms. E 3915, v.r.; E 3917, v.r.; E 3918, v.r.

50 GUTTULINA YABEI Cushman and Ozawa 1930

Polymorphina oblonga Brady (non d'Orb.) 1884, pl. lxxiii, fig. 6, 7.
P. thouini Chapman (non d'Orb.) 1907, pl. x, fig. 2.
Guttulina yabei Cushman and Ozawa 1930, 30, pl. iv, fig. 6, 7; Parr and Collins, 1937, 192, pl. xii, fig. 3, 4 a-c; pl. xiii, fig. 4 a-c.

This species is usually found at moderate depths (6-114 fathoms). It has been recorded (as *P. oblonga*) by the "Challenger" from Bass Strait (38-40 fathoms) and Port Jackson (6 fathoms); other localities are off Japan and New Zealand (off the Snares). E 3915, r.

Genus GLOBULINA d'Orbigny 1826

51 GLOBULINA GIBBA d'Orbigny var. GLOBOSA (Münster 1838)

Polymorphina globosa Münster 1838 (in Roemer), 386, pl. iii, fig. 33.

Globulina gibba var. *globosa*, Cushman and Ozawa 1930, 60, pl. xvi, fig. 1-4; Parr and Collins, 1937, 199, pl. xii, fig. 13.

Common in shore sand off the coast of Victoria. Also from Burnie, Tasmania, and Glenelg, South Australia (Parr and Collins). E 3923, v.r.

Genus GLANDULINA d'Orbigny 1826

52 GLANDULINA LAEVIGATA (d'Orbigny 1826)

Nodosaria (Glandulina) laevigata d'Orbigny 1826, 252, No. 1, pl. x, fig. 1-3; Brady, 1884, 490, pl. lxi, fig. 20-22.

Glandulina laevigata, Cushman and Ozawa 1930, 143, pl. xl, fig. 1 *a, b*; Parr and Collins, 1937, 208, pl. xiii, fig. 6 *a-c*.

Brady's figured specimen came from the West Indies (*vide* Nuttall). Parr and Collins record it from Oyster Bay, Tasmania. My previous note of its occurrence in "Endeavour" material is from Station 36, east of Tasmania, 777 fathoms. *G. laevigata* is found fossil in the Lower Miocene and Pliocene of Victoria and in the Lower Miocene of Table Cape, Tasmania. E 3919, r.

Fam. BULIMINIDAE

Genus BULIMINELLA Cushman 1911

53 BULIMINELLA sp.

Bulimina elegantissima v. *seminuda* Brady 1884 (non Terquem).

This species is now under description, in the Results of the Mawson Expedition to Antarctic, 1929-31. E 3915, v.r.

Genus BULIMINA d'Orbigny 1826

54 BULIMINA ACULEATA d'Orbigny 1826

d'Orb. 1826, 269, No. 7; Brady, 1884, 406, pl. li, fig. 7-9.

A species universally distributed, and usually found in deep water. It often accompanies *B. marginata* according to Dr. H. B. Brady. It is found as far south as the Antarctic Ice Barrier. Records in the Australian region are: 27½ miles east of Port Jackson Head, New South Wales (Goddard and Jensen) and Western Australia (Egger). Previous records from "Endeavour" material are: Station 36, east of Tasmania, 777 fathoms and east of Tasmania, 1,122 fathoms.

E 3922, v.r.

55 BULIMINA ELEGANS d'Orbigny 1826

d'Orbigny 1826, 270, No. 10; Modèle, No. 9; Brady, 1884, 398, pl. l, fig. 1-4; Chapman and Parr, 1937, 86.

Recorded from the Islands of the South Pacific and from the coast of New Zealand. Chapman and Parr have recorded it from stations close to the Antarctic Ice Barrier.

NOTE ON THE "ENDEAVOUR" EXAMPLES—Typical forms of regularly ovate-elongate contour tend to have the initial series of chambers spinose or marginate, and thus pass into *B. marginata*. Dr. C. Fornasini found the same variation in his specimens of *B. elegans* from the Adriatic (Accad. Sci. Ist. Bologna, 1901, 375). These variations are shown on pl. o, fig. 7, 14, 33, 39, of his paper.

E 3920, c.; E 3921, f.; E 3922, f.

56 *BULIMINA* sp. aff. *MARGINATA* d'Orbigny 1826

(Pl. viii, fig. 6)

The figured specimens of the "Challenger" Report (Brady, 1884), were drawn from examples obtained off the west coast of Ireland. The forms met with in southern waters are of more tumid build and have the free edge of the segments more coarsely crenulated than those from the northern hemisphere.

E 3915, r.; E 3916, v.r.; E 3917, v.r.; E 3919, v.r.; E 3920, r.; E 3922, f.

57 *Bulimina notovata* sp. nov.

Bulimina ovata Brady (non d'Orbigny, 1846) 1884, pl. 1, fig. 13 *a, b*.

Brady's figured specimens of *B. "ovata"* were obtained east of New Zealand (*vide* Nuttall). d'Orbigny obtained his fossil type from the Miocene of the Vienna Basin; when the latter is compared with the living form, so familiar in southern waters, the differences are easily seen. *B. ovata*, according to the figured type, is a long ovate form, with the segments slightly inflated and prominent and therefore specifically different from the "Challenger" specimen. Goës (1894, 45) has placed Brady's *ovata* in the synonymy of *Bulimina ellipsoides* Costa, but that form, according to Goës' figures (1894, pl. viii, fig. 31-36), is also distinct from this southern living species.

E 3918, r.

Genus *VIRGULINA* d'Orbigny 182658 *VIRGULINA SUBSQUAMOSA* Egger 1857

Egger 1857, 295, pl. xii, fig. 19-21; Brady, 1884, 415, pl. lii, fig. 7-11; Chapman and Parr, 1937, 89.

The "Challenger" figures of the above came from Tahiti (Nuttall). Heron-Allen and Earland obtained it around the Falkland Islands and Egger in the South Pacific. The "Aurora" soundings (Mawson, 1911-14) showed that this species commonly occurred to the east and south of Tasmania, and more rarely near the Antarctic Ice Barrier.

E 3919, f.; E 3923, r.

Genus *BOLIVINA* d'Orbigny 183959 *BOLIVINA ALATA* (Seguenza 1862)

Vulvulina alata Seguenza 1862, 115, pl. ii, fig. 5, 5 *a*.

Bolivina beyrichi Reuss var. *alata* Brady (pars) 1884, pl. liii, fig. 2-4.

This form appears to be common in the Late Tertiary and Recent of Italy and the Mediterranean. One of the figured specimens of the "Challenger" came from the Philippines. It was of frequent occurrence in the "Aurora" soundings east of Tasmania.

E 3916, f.; E 3917, v.r.; E 3919, r.; E 3920, f.; E 3922, r.

60 *BOLIVINA* sp. aff. *HENTYANA* Chapman 1916

Bolivina hentyana Chapman 1916¹, 145, fig.

This species is common in one of the "Endeavour" soundings of the present series. It is a recent modification of the Lower Miocene fossil, *B. hentyana* Chapman.

E 3915, v.c.; E 3917, v.r.; E 3918, r.

61 *BOLIVINA BEYRICHI* REUSS 1851

Reuss 1951², 83, pl. vi, fig. 51; Brady, 1884, 422, pl. liii, fig. 1; Chapman and Parr, 1937, 90.

This species occurred off Sydney at 110 fathoms ("Challenger"). Dr. Egger records it off the coast of Western Australia. It was found in material gathered by the "Aurora," 1911-14, and in former "Endeavour" soundings, in

abundance at Station 36, east of Tasmania, 777 fathoms, and rarely at 1,122 fathoms in the same locality. E 3915, c.; E 3916, r.; E 3917, v.r.; E 3918, f.; E 3919, v.r.; E 3920, f.; E 3921, f.; E 3922, v.c.

62 BOLIVINA LIMBATA Brady 1884

Brady 1884, 419, pl. liii, fig. 26-28; Chapman, 1907, 32, pl. iv, fig. 83.

A well-distributed form in the Tasman Sea and the Indo-Pacific area. It has previously occurred in "Endeavour" material, east of Tasmania, at 1,122 fathoms, and 40 miles south of Cape Wiles at 100 fathoms. It is also a Lower Miocene fossil in Victoria.

E 3921, v.r.; E 3923, r.

63 BOLIVINA PUNCTATA d'Orbigny 1839

d'Orbigny 1839³, 63, pl. viii, fig. 10-12; Chapman, 1907, 32, pl. iv, 80; Chapman and Parr, 1937, 92, pl. viii, fig. 16.

Widely distributed in Australian waters. Previously recorded from "Endeavour" material, Station 36, east of Tasmania, 777 fathoms. Also in shore sands at Beaumaris, Port Phillip (Chapman).

E 3919, v.r.

64 BOLIVINA ROBUSTA Brady 1884

Brady 1884, 421, pl. liii, fig. 7-9; Cushman, 1937, 131, pl. xvii, fig. 1-4.

Widely spread through Atlantic, Pacific, and Indian Oceans and Antarctic Seas. The "Challenger" figures are from the Ki Islands and Fiji. It has been recorded from former "Endeavour" material, east of Tasmania, 777 fathoms, and 40 miles south of Cape Wiles, 100 fathoms.

E 3920, c.; E 3921, v.r.; E 3922, f.

Genus RECTOBOLIVINA Cushman 1927

65 RECTOBOLIVINA BIFRONS (Brady 1884)

Sagrina bifrons Brady 1884, 582, pl. lv, fig. 18-20.

Rectobolivina bifrons, Cushman, 1937, 204, pl. xxiii, fig. 13, 14.

Noted in dredgings made by the "Aurora," 1911-14, Antarctic Expedition, off the east coast of Tasmania. The "Challenger" record is off south-east of Japan. It is known also from the Philippines and from Funafuti, this latter a record of great depth (2,400 fathoms), by Chapman. Egger obtained it from "Gazelle" dredgings off Western Australia.

E 3917, v.r.; E 3923, v.r.

Genus LOXOSTOMUM Ehrenberg 1854

66 LOXOSTOMUM KARRERIANUM (Brady 1884)

Bolivina karreriana Brady 1884, 424, pl. liii, fig. 19-21.

Loxostomum karrerianum (Brady), Cushman 1937, 184, pl. xxi, fig. 17.

This species is well distributed in the Southern Hemisphere, from Mauritius, the Philippines and the Fijis down to the east coast of Australia and New Zealand.

E 3915, v.r.; E 3917, f.

Genus BIFARINA Parker and Jones 1872

67 BIFARINA FIMERIATA (Millelt 1900)

(Pl. ix, fig. 4)

Bigenerina fimbriata Millelt 1900, 6, pl. i, fig. 2-4.

Bifarina fimbriata (Millelt), Cushman 1937, 200, pl. xxiii, fig. 3-5; pl. iii, fig. 4.

The only record for this species was the Malay Archipelago. It is now noted for the first time from the Australian region, viz., 33 miles east from Green Cape, 470 fathoms.

E 3922, v.r.

Genus UVIGERINA d'Orbigny 1826

68 UVIGERINA sp. aff. PIGMEA d'Orb. 1826

Uvigerina pigmea d'Orbigny 1826, 269.

One of the most ubiquitous species in the Bass Strait dredgings. Both A and B stages (megalo- and microspheric) are represented. This type corresponds to Brady's fig. 13, 14, of pl. lxxiv, "Challenger" Report, which came from Station 232, south of Japan (*vide* Nuttall).

E 3915, v.c.; E 3916, c.; E 3917, v.r.; E 3918, c.; E 3919, c.;
E 3920, r.; E 3921, v.r.; E 3922, c.; E 3923, f.

Genus TRIFARINA Cushman 1923

69 TRIFARINA BRADYI Cushman 1923

Rhabdogonium tricarinarum Brady (non *Vaginulina tricarinata* d'Orb.) 1884, 525, pl. lxxvii, fig. 1-3.

Trifarina bradyi Cushman 1923, 99, pl. xxii, fig. 3-9; Chapman and Parr 1937, 98.

The "Aurora" dredgings off the coast of Tasmania, at 1,320 fathoms, included the above species. Heron-Allen and Earland noted this form from the "Terra Nova" dredgings off New Zealand.

The present record is from 33 miles east by south from Green Cape, 470 fathoms. As a fossil it occurs in the Lower Miocene of Victoria.

E 3920, v.r.

Genus CASSIDULINA d'Orbigny 1826

70 CASSIDULINA CRASSA d'Orbigny 1839

d'Orbigny 1839³, 56, pl. vii, fig. 18-20; Cushman 1911, 97, text-fig. 151 a-c; Chapman and Parr 1937, 81.

This species becomes increasingly abundant towards the south. Falkland Islands and Cape Horn (d'Orbigny). The results of the Mawson Expedition showed its distribution to extend to the east of Tasmania and the Ice Barrier.

E 3917, r.

71 CASSIDULINA LAEVIGATA d'Orbigny 1826

d'Orbigny 1826, 282, No. 1, pl. xv, fig. 4, 5; Brady 1884, 428, pl. liv, fig. 1-3.

The "Aurora" results, 1911-14, proved the occurrence of this species to the east of Tasmania at 1,320 fathoms. The present investigation shows it to be abundant in fairly deep water, 33 miles east by south from Green Cape, north of the Victorian border. It is of minute size and only occurs in the finest siftings. *C. laevigata* is also fossil in the Lower Miocene of Victoria.

E 3919, v.r.; E 3920, v.c.; E 3921, v.r.; E 3922, v.c.

72 CASSIDULINA SUBGLOBOSA Brady 1884

Brady 1884, 430, pl. liv, fig. 17 a-c.

The "Challenger" figured specimens came from Pernambuco, Brazil. It is a well-distributed species in the Southern Ocean. Common as a Miocene fossil in Victoria.

E 3920, r.; E 3922, v.r.; E 3923, f.

73 CASSIDULINA SUBGLOBOSA var. PRODUCTA Chapman and Parr 1937

Cassidulina murrhyna Chapman (non Schwager) 1915, 20.

Cassidulina subglobosa Brady, var. *producta* Chapman and Parr 1937, 82, pl. viii, fig. 12.

The "*C. murrhyna*" of Schwager of my previous report on "Endeavour" material from east of Tasmania, 1,122 fathoms, has since proved to belong to a

variety of Brady's species, *C. subglobosa*. Also as a fossil in the Lower Miocene of Victoria. E 3920, v.r.; E 3923, v.r.

Fam. PLEUROSOTOMELLIDAE

Genus ELLIPSOLAGENA A. Silvestri 1928

74 ELLIPSOLAGENA SCHLICHTI (Silvestri 1902)

Fissurina schlichti A. Silvestri 1902, 143, text-fig. 9-11.

Ellipsolagena schlichti, Chapman and Parr 1937, 99.

Previous records for this species are:—the Subantarctic Islands of New Zealand, 50-85 fathoms; soundings from 121-171 fathoms in the Ross Sea, Antarctic, and from the "Terra Nova" Stations off New Zealand. From "Endeavour" material (Chapman 1915) it was obtained east of Tasmania, 777 fathoms. E 3919, v.r.; E 3920, r.

Fam. HETEROHELICIDAE

Genus BOLIVINITA Cushman 1927

75 BOLIVINITA QUADRILATERA (Schwager 1866)

Textularia quadrilatera Schwager 1866, 253, pl. vii, fig. 103.

Bolivina obsoleta, Chapman (non Eley) 1915, 20.

Bolivinita quadrilatera, Chapman and Parr 1937, 101.

The dredgings from the "Aurora" containing this species came from the east of New Zealand. As *Bolivina obsoleta* this species was recorded in 1915 from "Endeavour" material, east of Tasmania, 777 and 1,122 fathoms.

E 3918, c.; E 3919, v.r.; E 3920, r.; E 3921, v.r.; E 3922, v.c.; E 3923, v.r.

***Bolivinita quadrilatera* (Schwager) var. *tortilis* nov.**

(Pl. iii, fig. 3)

Description—Differs from the specific form in having deeply concave faces, a twisted and incurved test and the opposite sides or square edges out of parallel, so that when mounted on edge one of the keels appears to be interfacial. The transverse section, therefore, resembles that of *Bolivina rhomboidalis* Millett, to which it was referred at first sight. It may yet prove that Millett's species is another modification of *Bolivinita* and not a true *Bolivina*. Length, 0.75 mm.; greatest breadth, 0.24 mm.

NOTE—Heron-Allen and Earland draw attention to the fact that their "*Bolivina obsoleta*" (now *Bolivinita quadrilatera*), from "Terra Nova," Station 6, east of North Cape, New Zealand, has a spiral twist. In all probability the present variety is identical with theirs. E 3920, f.; E 3921, v.r.; E 3922, f.

Genus BOLIVINELLA Cushman 1927

77 BOLIVINELLA FOLIUM (Parker and Jones 1865)

Textularia folium Parker and Jones 1865, 370 and 420, pl. xviii, fig. 19; Brady 1884 (pars), 357, pl. xlii, fig. 1, 2; Chapman 1907, 127, pl. ix, fig. 4.

Bolivinitella folium Cushman 1927, 79; 1928, pl. xxxiii, fig. 15, 16; Parr 1931, 223, pl. xxi, fig. 23.

Parr has pointed out (op. cit., 1931) that Brady had confused two distinct species under Parker and Jones' name, and that subsequently Cushman gave an unnecessary varietal name, *ornata*, to the Australian species. This Australian form is typical of *B. folium* (P. and J.), and the tropical species erroneously linked with Parker and Jones' Australian form is distinct; for this Parr suggests *Bolivinitella elegans*.

Although Parr refers to this second species figured by Brady (op. cit., pl. xlii, fig. 3-5) as tropical, Nuttall has given all but fig. 3, which came from Fiji, as from Bass Strait.

I have already recorded this species under the name of *Textularia folium*, from McHaffie's Reef, Phillip Island, as well as from previous "Endeavour" material from 40 miles south of Cape Wiles, 100 fathoms. The localities given by Parr are Hardwicke Bay, South Australia, and a bore at Bonco, near Rosebud, at 177-187 feet (Pleistocene).

Bolivina folium occurs in one of the present samples, 33 miles east by south from Green Cape, north of the Victorian border, at 470 fathoms.

E 3918, r.

*Genus PARAFRONDICULARIA Asano 1938

78 *Parafrondicularia helenae* sp. nov.

(Pl. ix, fig. 5, 5a)

Fronidularia interrupta Brady (non Karrer) 1884, 523, pl. lxvi, fig. 6, 7.

Description—Test narrowly hastate, margin finely, narrowly keeled; surface complanate, with a longitudinal shallow sulcus, and with closely set vertical raised striae numbering about 18-20. Chambers V-shaped for the last three-fourths of the test, the initial fourth being taken up by the biserial growth. The later frondicularian chambers consisting of eight enchevroned segments. Aperture terminal, central and elliptical, with a denticulate margin. Length, 0.946 mm.; greatest breadth, 0.243 mm.

Observations—Brady's figured specimen agrees with the present type in length, measuring about 1 mm. Its habitat was off the Ki Islands, south-west of New Guinea. He identified his "Challenger" specimen with Karrer's *Fronidularia interrupta*, from the Lower Miocene of Baden, Vienna (Karrer, F., 1877, 380, pl. xvi b, fig. 27). The Bass Strait and the New Guinea examples both belong to the genus *Parafrondicularia*. On reference to Karrer's original figure we find the arrangement of chambers is specifically frondicularian, and this is supported by his own description. It is also clear that the interrupted character of the striations is a feature in Karrer's species, hence the name, whereas the Australian form has continuous striae throughout the length of the test.

NOTE—I dedicate this beautiful species to the memory of my wife, who for nearly fifty years has been my constant and devoted helper in studies on the Foraminifera. Only within a short time of her passing, Mrs. Helen Mary Chapman assisted me in selecting the material included in the present investigation. From the time of describing the Foraminifera of the Gault of Folkestone, the genus *Fronidularia* and its allies were to her particularly attractive.

E 3922 f.

Genus NODOGENERINA Cushman 1927

79 *Nodogenerina bradyi* Cushman 1927

Sagrina virgula, Brady (pars), 1884, 583, pl. lxxvi, fig. 8.

Nodogenerina bradyi Cushman 1927, 79.

Brady found that the above form was confined to the South Pacific. The figured specimen was dredged by the "Challenger" from Pernambuco (Nuttall).

E 3922, v.r.

80 *Nodogenerina insolita* (Schwager 1866)

Nodosaria insolita Schwager 1866, 230, pl. vi, fig. 63; Cushman 1921, 191.

This species was originally described as a fossil (Pliocene), from Kar Nikobar. Cushman has recorded the species from the "Albatross" dredgings from Verde Island Passage at 260 fathoms, and from the east coast of

* See first footnote on page 154.

Mundanao, 490 fathoms, both in the Philippines. Unknown hitherto to the Australian coast.

E 3917, v.r.

Fam. ROTALIIDAE

Genus PATELLINA Williamson 1858

81 PATELLINA CORRUGATA Williamson 1858

Williamson 1858, 46, pl. iii, fig. 86-89; Brady 1884, 634, pl. lxxxvi, fig. 1-7; Heron-Allen and Earland 1922, 198; Parr and Collins 1930, 90, pl. iv, fig. 1-5; Chapman and Parr 1937, 102.

This species was found in "Aurora" dredgings close to the Antarctic Ice Barrier and near Macquarie Island. Parr and Collins recorded it from Geraldton Harbour, West Australia, and east of Cape Saunders, Otago, New Zealand. Earlier records of mine are from the Subantarctic Islands of New Zealand (off the Snares, 60 fathoms and 10 miles north of Enderby Island, 85 fathoms), and east of Tasmania, 777 and 1,122 fathoms ("Endeavour").

E 3923, v.r.

Genus PATELLINELLA Cushman 1928

82 PATELLINELLA INCONSPICUA (Brady 1884)

Textularia inconspicua Brady 1884, 357, pl. xlii, fig. a-c; Millett 1899, 557, pl. vii, fig. 1.

Patellinella inconspicua, Cushman 1928, 5, pl. i, fig. 8 a-c; Parr and Collins 1930, 92, pl. v, fig. 7.

This species ranges from the south of Japan, through Admiralty Islands, Malay Archipelago to Bass Strait and New Zealand. It also occurs in the Indian Ocean, at Kerimba. Parr and Collins give additional localities around Victoria—shore sand Port Lonsdale, Torquay and Port Fairy. As a Pleistocene fossil it was found in a boring at Boneo, near Rosebud, at 177-187 feet (W. J. Parr). One of the "Challenger" Stations for this species was Moncoeur Island Bass Strait.

E 3919, r.

Genus DISCORBIS Lamarck 1804

83 DISCORBIS AUSTRALIS Parr 1931

Discorbina valvulata Brady (non *Rosalina valvulata* d'Orb.) 1884, 644, pl. lxxxvii, fig. 57.

Discorbis australis Parr 1931, 227, pl. xxii, fig. 31 a-c.

This species occurred at Moncoeur Island, Bass Strait and near Fiji (Brady). It is found in shallow water on the coast of Victoria and fossil in the Lower Miocene of Muddy Creek (Parr).

E 3915, v.r.

84 DISCORBIS BERTHELOTI (d'Orb. 1839)

Rosalina bertheloti d'Orbigny 1839¹, 135, pl. i, fig. 28-30.

Discorbina bertheloti, Brady 1884, 650, pl. lxxxix, fig. 10-12.

Discorbis bertheloti, Chapman, Parr and Collins 1934, 561, pl. ix, fig. 13 a-c; Chapman and Parr 1937, 102.

Recorded by Brady from the Philippines, and down to the south-east corner of the Australian coast. Found in Bass Strait and along the Victorian coast. From the "Aurora" dredgings, east of Tasmania, at 1,320 and 1,300 fathoms. It is a common Tertiary fossil in Victoria, as old as the Lower Miocene.

E 3916, r.; E 3917, r.; E 3918, r.; E 3920, r.

85 DISCORBIS DIMIDIATUS (Jones and Parker 1862)

Discorbina dimidiata Jones and Parker (in Carpenter) 1862, 201, fig. xxxii B (in text); Chapman 1907, p. 136, pl. x, fig. 8 a, b.

Discorbis vesicularis (Lam.), var. *dimidiata*, Parr 1932, 227, pl. xxi, fig. 27 a-c., 28 a-c, 29 a-c.

Discorbis dimidiatus, Chapman and Parr 1937, 103.

Recorded from shore gatherings round Victoria, from Altona Bay, Beaumaris, McHaffie's Reef, Phillip Island, Port Nepean, Shoreham and Torquay. Common on the Australian coast below Sydney. On beaches near Auckland, New Zealand (Parr).

This species has also been noted from "Aurora" dredgings near the Antarctic Ice Barrier and east of Tasmania. E 3919, r.; E 3923, r.

86 DISCORBIS DISPARILIS (Heron-Allen and Earland 1922)

Discorbina disparilis Heron-Allen and Earland 1922, 205, pl. vii, fig. 20-22.

Discorbis disparilis, Parr 1932, pl. xlv, fig. 2.

Originally recorded off New Zealand, 100 fathoms. Parr has since noted it in Victorian shore sands. E 3917, v.r.

87 DISCORBIS OPERCULARIS (d'Orbigny 1826)

Rosalina opercularis d'Orb. 1826, 7, 271, No. 7; 1839², 101, pl. iii, fig. 24, 25, pl. iv, fig. 1.

Discorbina opercularis, Brady 1884, 650, pl. lxxxix, fig. 8, 9.

Brady records this species from Moncoeur Island, Bass Strait (at 38 fathoms) and Port Jackson, 2-10 fathoms. Also from Torres Strait and Queensland.

E 3916, r.; E 3923, r.

88 DISCORBIS ORBICULARIS (Terquem 1876)

Rosalina orbicularis Terquem 1876, 75, pl. ix, fig. 4 a-b.

Discorbina orbicularis, Brady 1884, 647, pl. lxxxviii, fig. 4-8.

This species is known from both the Atlantic and Pacific Oceans and is found as far south as the southern coast of Australia (Brady). My previous record in "Endeavour" material was 40 miles south of Cape Wiles, 100 fathoms.

E 3918, v.r.; E 3923, r.

89 DISCORBIS RARESCENS (Brady 1884)

Discorbina rarescens Brady 1884, 651, pl. xc, fig. 2, 3.

Discorbis rarescens, Chapman and Parr 1937, 105.

The "Challenger" examples came from Raine Island, Torres Strait and from the Philippines. Heron-Allen and Earland obtained this species in "Terra Nova" dredgings off the coast of New Zealand. From the "Aurora" samples it occurred east of Tasmania, in 1,320 fathoms.

E 3918, v.r.; E 3923, r.

90 DISCORBIS ROSACEA (d'Orbigny 1826)

Rotalia rosacea d'Orbigny 1826, 7, 273, No. 15—Modèle No. 39.

Discorbina rosacea, Brady 1884, 644, pl. lxxxvii, fig. 1, 4; Chapman 1915, 29.

The "Challenger" specimens were figured from Admiralty Islands, north of New Guinea and Bass Strait (Nuttall). Found in former "Endeavour" material, 40 miles south of Cape Wiles, 100 fathoms.

E 3918, v.r.; E 3919, v.r.

91 DISCORBIS RUGOSA (d'Orbigny 1839)

Rosalina rugosa d'Orbigny 1839³, 42, pl. ii, fig. 12-14.

Discorbina rugosa, Brady 1884, 652, pl. lxxxvii, fig. 3 a-c, pl. xcvi, fig. 4 a-c; Chapman 1915, 29.

The "Challenger" figured specimens were obtained from the Ki Islands and Torres Strait. It has already occurred in "Endeavour" material, east of Tasmania, 777 fathoms.

E 3923, v.r.

92 DISCORBIS GLOBULARIS (d'Orbigny 1826)

Rosalina globularis d'Orb. 1826, Modèles No. 69, 271, pl. xiii, fig. 1-4.

Discorbina globularis, Brady 1884, pl. lxxxvi, fig. 8 and 13.

This widely spread species occurs in Sample E 3918. Heron-Allen recorded it from the coasts of New Zealand ("Terra Nova" Report).

E 3918, v.c.

Genus EPONIDES Montfort 1808

93 EPONIDES KARSTENI (Reuss 1855)

Rotalia karsteni Reuss 1855, 275, pl. ix, fig. 6.

Pulvinulina karsteni, Brady 1884, 698, pl. cv, fig. 8, 9.

The "Challenger" recorded this species from the Magellan Strait at 55 fathoms, from which locality it was figured; also from the Falkland Islands, 4 fathoms, and the Rio Plata, 13 fathoms.

E 3922, v.r.; E 3923, r.

94 EPONIDES REPANDUS (Fichtel and Moll 1798)

Nautilus repandus Fichtel and Moll 1798, 35, pl. iii, fig. a-d.

Pulvinulina repanda, Brady 1884, 684, pl. civ, fig. 18 a-c; Cushman 1921, 326.

Found in every sea, excepting the Arctic (Brady). Cushman records this species at many Stations in the Philippines. In previous "Endeavour" dredgings, 40 miles south of Cape Wiles, 100 fathoms. Common in Tertiary strata from borings in Victoria.

E 3915, r.

Genus STREBLUS Fischer 1817

95 STREBLUS BECCARII (Linn. 1767)

Nautilus beccarii L. 1767, Syst. Nat., 12th ed. 1,162.

Streblus beccarii, Fischer 1819, 75.

Rotalia beccarii, Brady 1884, 704, pl. cvii, fig. 2, 3.

This species ranges from the Shetlands to the Cape of Good Hope (Brady). It is well established in the Philippines at the average depth of 318 fathoms. It is common as a fossil in borings in the Tertiaries of Victoria and South Australia, especially the Pleistocene.

E 3915, c.; E 3917, r.; E 3918, r.; E 3920, v.r.; E 3922, v.r.

Genus NOTOROTALIA Finlay 1939

96 NOTOROTALIA CLATHRATA (Brady 1884)

Rotalia clathrata Brady 1884, 709; pl. cvii, fig. 8, 9; Chapman 1915, 32, 33; Chapman and Parr 1937, 108.

Common around the New Zealand coast. Brady's Report shows its restriction to the South Pacific, between Monocur Island, Bass Strait and Cook Strait, New Zealand. It has also been found at two Stations on the west coast of Patagonia, and also occurred in shore sands at Torquay, Victoria. Previous records

from "Endeavour" material are: Station 36, east of Tasmania, 777 fathoms, and 40 miles south of Cape Wiles, 100 fathoms. Fossil in the Tertiary bores in Victoria.

E 3920, v.r.; E 3922, v.r.

97 *Notorotalia decurrens* sp. nov.

(Pl. viii, fig. 7 a, b)

Description—Test rotaline, plano-convex, depressed. Superior face almost flat, with thickened sutural shell development, breaking up into papillae near the initial stage of the shell. Inferior face strongly convex, with thickened, curved sutural lines of a more regular character than those on the upper surface, with faint striae at right angles between them. Diameter of test, 0.386 mm.

Distinct from Brady's *Rotalia clathrata* in the suppression of strong lattice ornament, surface sutural thickening and more depressed superior face.

E 3915, r.; E 3917, v.r.; E 3918, f.

Genus *EPISTOMINA* Terquem 1883

98 *EPISTOMINA ELEGANS* (d'Orbigny 1826)

Rotalia (Turbinulina) elegans d'Orbigny 1826, 7, 276, No. 54.

Pulvinulina elegans, Parker, Jones and Brady 1871, 174, pl. xii, fig. 142; Brady 1884, 699, pl. cv, fig. 4-6.

Brady's figured specimens came from Tristan d'Acunha and Fiji. This species was common in "Aurora" material, between Tasmania and the Antarctic Ice Barrier. Previous records of "Endeavour" material, 40 miles south of Cape Wiles, 100 fathoms.

E 3915, c.; E 3917, r.; E 3918, r.; E 3919, v.r.; E 3922, f.

Genus *MISSISSIPPINA* Howe 1930

99 *MISSISSIPPINA CONCENTRICA* (Parker and Jones 1864)

Pulvinulina concentrica Parker and Jones (in Brady) 1864, 470, pl. xlviii, fig. 14; Brady 1884, 686, pl. cv, 1 a-c.

Eponides concentricus, Chapman, Parr and Collins, 1934, 565, pl. ix, 17 a-c.

Common and typical in the Philippines (Cushman). Previous record from "Endeavour" material, 40 miles south of Cape Wiles, 100 fathoms. Common and of variable size. Found in the Lower Miocene of Port Phillip.

E 3919, r.

Genus *CANCERIS* Montfort 1808

100 *CANCERIS AURICULA* (Fichtel and Moll 1798)

Nautilus auricula Fichtel and Moll 1798, 108, pl. xx a-c; pl. xx d-f.

Pulvinulina auricula, Brady 1884, 688, pl. cvi, fig. 5 a-c; Chapman 1915, 31; Cushman 1915, 53, pl. xxii, fig. 1.

Canceris auricula, Cushman 1931, 72, pl. xv, fig. 1 a-c; Chapman and Parr 1937, 109.

A well distributed species in southern waters. Records from the "Aurora" give one typical example east of Tasmania, 1,320 fathoms. From the "Terra Nova" was noted at 7 miles east of North Cape, New Zealand. Also occurred in dredgings by the trawler "Bonthorpe" in the Great Australian Bight. Cushman states in his Philippine memoir, 1921, that it is one of the characteristic species in the dredgings off the Philippines below 100 fathoms. Previously recorded in "Endeavour" material, 40 miles south of Cape Wiles, 100 fathoms. Common as a fossil in the Lower Miocene of Victoria.

E 3916, v.r.

Genus ANOMALINA d'Orbigny 1826

101 ANOMALINA COLLIGERA Chapman and Parr 1937

Anomalina ammonoides, Brady (non *Rosalina ammonoides* Reuss) 1884, 672, pl. xciv, fig. 2, 3.

Anomalina colligera Chapman and Parr 1937, 117, pl. ix, fig. 26.

Brady's "Challenger" specimens came from Fiji and Papua. The "Aurora" examples were found in dredgings east of Tasmania and between Tasmania and the Antarctic. It was recently recorded from the Great Australian Bight ("Bonthorpe"). Previous records from the "Endeavour" (Chapman 1915, as *A. ammonoides*) were—east of Tasmania, 777 fathoms, and 40 miles south of Cape Wiles, 100 fathoms.

E 3915, v.r.; E 3922, v.r.

102 ANOMALINA GLABRATA Cushman 1924

Cushman 1924¹, 39, pl. xii, fig. 5-7; Chapman, Parr and Collins 1934, 570, pl. xi, fig. 39 a-c; Chapman and Parr 1937, 117.

Type locality, off Samoa, in shallow water. From "Aurora" dredgings this species was obtained off the Shackleton Shelf, Antarctic, and south and north-east of Tasmania. It also occurs as a fossil in the Miocene of Victoria (Parr) and in beds of the same age in California.

E 3915, c.; E 3917, r.; E 3918, v.r.; E 3920, r.; E 3922, v.r.

103 ANOMALINA GLOBULOSA Chapman and Parr 1937

Anomalina grosserugosa, Brady (non *Truncatulina grosserugosa* Gumbel) 1884, 673, pl. xciv, fig. 4, 5.

Anomalina globulosa Chapman and Parr 1937, 117, pl. ix, fig. 27.

Brady's "Challenger" Stations for this form are situated in the North and South Atlantic and the North Pacific; two are in the South Pacific. *A. globulosa* occurred in the "Aurora" soundings off St. Frances Island and to the east of Tasmania. It has also been found on the coasts of Victoria and New South Wales. Under the name of *A. grosserugosa* it was recorded earlier from an "Endeavour" sample, east of Tasmania, 777 fathoms.

E 3920, v.r.; E 3922, v.r.

104 ANOMALINA POLYMORPHA Costa 1856

Costa 1856, 252, pl. xxi, fig. 7-9; Brady 1884, 676, pl. xcvi, fig. 3-7; Chapman, 1907, 138.

Recorded by the "Challenger" off Sydney, 410 fathoms, west of New Zealand, 275 fathoms and Fiji, 210 fathoms. Previous "Endeavour" material proved this species to be common at 40 miles south of Cape Wiles, 100 fathoms. It was also found in shore sand at Beaumaris, Port Phillip.

E 3917, v.r.; E 3918, v.r.; E 3923, v.r.;

105 ANOMALINA sp. aff. ROTULA d'Orbigny 1846

Anomalina rotula d'Orbigny 1846, 172, pl. x, fig. 10-12; Macfadyen 1930, 99, pl. iv, fig. 10 a-c; Chapman, Parr and Collins 1934, 570, pl. xi, fig. 38 a-c.

Hitherto a fossil (Miocene) species, from the Vienna Basin, Egypt and Victoria. The recent specimens are not quite typical when compared with the Lower Miocene fossils from Victoria.

E 3915, f.

106 ANOMALINA VERMICULATA (d'Orbigny 1839)

Truncatulina vermiculata d'Orbigny 1839³, 39, pl. vi, fig. 1-3.

Anomalina polymorpha Costa?, Brady, 1884, 676 pl. xcvi, fig. 7.

Anomalina vermiculata, Heron-Allen and Earland 1932, 423, pl. xv, fig. 1-15.

Common in the Falkland area (H.-A. and E.).

E 3915, f.; E 3920, v.r.

Genus PLANULINA d'Orbigny 1826

† 107 PLANULINA BICONCAVA (Parker and Jones 1862)

Discorbina biconcava Parker and Jones (in Carpenter) 1862, 201, text-fig. xxxii;
Brady 1884, 653, pl. xci, fig. 2 a-c (non fig. 3).

The "Aurora" soundings from east of Tasmania contained examples of this species. Also found off New Zealand ("Terra Nova"). Notably an Australian species, it has been found in Bass Strait, Port Jackson, Torres Strait and Gulf of Carpentaria. As *Discorbina biconcava* it also came from a former "Endeavour" dredging, 40 miles south of Cape Wiles, 100 fathoms. E 3918, v.r.

108 PLANULINA BICONCAVA (Parker and Jones), var. UNGUICULATA
(Sidebottom 1918)

Discorbina lingulata, Burrows and Holland, var. *unguiculata* Sidebottom 1918, 255, pl. vi, fig. 12-14.

This variety appears to belong to the *Planulina* type of test rather than to *Heronallenia*, in which genus *lingulata* is now placed. It was originally obtained from Pteropod ooze, dredged by H.M.S. "Dart," Station 19, at 465 fathoms. The locality is north of Shoal Bay, New South Wales. E 3922, v.r.

109 PLANULINA HALIOTIS (Heron-Allen and Earland 1924)

Discorbina haliotis Heron-Allen and Earland 1924, 173, pl. xiii, fig. 99-101.

Originally described from the Lower Miocene of Batesford, Victoria, it is of much interest to find this species still existing in Bass Strait. The locality is 33 miles east from Green Cape, 470 fathoms. E 3922, v.r.

Genus CIBICIDES Montfort 1808

110 CIBICIDES AKNERIANUS (d'Orbigny 1846)

Rosalina akneriana d'Orb. 1846, 156, pl. viii, fig. 13-15.

Truncatulina akneriana, Heron-Allen and Earland 1932, 421.

Recorded in "Discovery" Reports as very common in the Falkland Island area. E 3920, v.r.

111 CIBICIDES LOBATULUS (Walker and Jacob 1798)

Nautilus lobatulus Walker and Jacob 1798, 642, pl. xiv, fig. 36

Cibicides lobatulus, Chapman and Parr 1937, 119.

Very common at a large number of Stations, from the Antarctic to Tasmania and New Zealand ("Aurora" Expedition).

E 3916, r.; E 3917, r.; E 3918, r.; E 3919, r.; E 3921, v.r.; E 3922, f.

112 CIBICIDES sp. aff. VICTORIENSIS Chapman, Parr and Collins 1934

Cibicides victoriensis Chapman, Parr and Collins 1934, 38, 571, pl. ix, fig. 16 a-c.

A recent development of the Victorian Miocene *C. victoriensis*.

E 3915, v.c.; E 3917, v.r.; E 3918, r.; E 3919, f.; E 3920, v.r.

113 CIBICIDES PSEUDOUNGERIANUS (Cushman 1922)

Truncatulina pseudoungeriana Cushman 1922, 97, pl. xx, fig. 9.

Cibicides pseudoungerianus Cushman 1930, 123, pl. xxii, fig. 3-7.

Universally distributed in Southern Seas.

E 3915, f.; E 3918, c.; E 3919, v.r.; E 3922, f.; E 3923, f.

† See second footnote, p. 154.

114 CIBICIDES REFULGENS Montfort 1808

Montfort 1808, I, 122, 31me genre.

Truncatulina refulgens, Brady 1884, 659, pl. xcii, fig. 7-9.

Of world-wide distribution, this species occurs generally in the Southern Hemisphere, and has been recorded from the Cape of Good Hope, Patagonia, Falkland Islands, the Antarctic Ice Barrier and up to the shores of the Australian continent.

E 3915, r.; E 3918, v.r.; E 3922, r.

115 CIBICIDES WUELLERSTORFI (Schwager 1866)

Anomalina wuellerstorfi Schwager 1866, 258, pl. vii, fig. 105, 107.

Truncatulina wuellerstorfi, Brady 1884, 662, pl. xciii, fig. 8, 9.

Cibicides wuellerstorfi, Chapman and Parr 1937, 21.

Brady's figured specimens came from the west coast of New Zealand. This species was also found in the "Bonthorpe" dredgings off the Great Australian Bight. Earlier "Endeavour" material recorded it from east of Tasmania, 777 fathoms, and 40 miles south of Cape Wilkes, 100 fathoms. Fossil examples are known from the Eocene and Miocene of New Zealand, and Schwager's specimens came from the Pliocene of Kar Nikobar.

E 3916, r.; E 3919, r.; E 3920, f.; E 3921, f.; E 3922, f.; E 3923, f.

Genus DYOCIBICIDES Cushman and Valentine 1930

116 DYOCIBICIDES BISERIALIS Cushman and Valentine 1930

Cushman and Valentine 1930, 31, pl. x, fig. 1, 2 *a-b*.; Cushman 1931, 126, pl. xxiv, fig. 2; Chapman, Parr and Collins 1934, 572, pl. xi, fig. 43 *a-c*.

Sparsely occurring off the coast of Australia and in the Southern Ocean. Also fossil in the lower Miocene and upward in Victoria.

E 3923, v.r.

Genus AMPHISTEGINA d'Orbigny 1826

117 AMPHISTEGINA LESSONII d'Orbigny 1826

d'Orbigny (pars) 1826, 304, No. 3, pl. xvii, fig. 1-4; Brady 1884, 740, pl. cxi, fig. 1-7.

The examples here recorded came from 505 fathoms, just north of Twofold Bay, New South Wales (37° 21' S., 150° 24' E.). It is probably a record for this high latitude, and it is interesting to note that the soundings from the "Bonthorpe" trawler, in the Great Bight, record another solitary instance of the species in high latitudes (from Sample 4, 33° 14' S., 126° 16' E.) at a depth of 100 fathoms, a little south of Dover Point.

E 3919, v.r.

Fam. CHILOSTOMELLIDAE

Genus CHILOSTOMELLA Reuss 1850

118 *Chilostomella cushmani* sp. nov.

(Pl. viii, fig. 9; pl. ix, fig. 6)

Chilostomella ovoidea Cushman (non Reuss) 1919, 621.

Cushman remarks, under the above reference, which deals with the examples found off "Poor Knights Islands," as follows: "There are several specimens mounted on the slide which seem to show possibly both microspheric and megalospheric forms. There are two very distinct sizes: the larger specimen is evidently somewhat like *C. grandis* Cushman, described from the Philippines. It is, however, not as large as that species."

The definition of these New Zealand chilostomellids as given by Cushman so well fits the characters of the specimens before me, and not *C. grandis*, that I have no hesitation in referring them to the same form as those from the "Endeavour" soundings, including their reference (as Cushman supposes in his case) to the forms A and B, as here illustrated. I have much pleasure, therefore, in naming the species after my long-standing, eminent and indefatigable friend, as *Chilostomella cushmani*.

Description—Test large, ovoid, about twice as long as broad; sides evenly and fully curved; aperture sub-terminal, with an elevated rim (stand-up-collar shape) and a widely open mouth. No internal segmentation visible from outside. Surface of test smooth to polished, with numerous scattered puncta. Length, 1.08 mm.; breadth, 0.65 mm. This is probably Form A, pl. ii, fig. 9.

Test small, more narrowly ovoid and thinner than in Form A, more pointed at oral end, with sides slightly more convex in proportion to Form A. Aperture slit-like, closely adpressed to surface of test and without a rim-like margin as in Form A. Surface smooth, less punctate and with internal chambers alternating on a transverse axis, the edges of which are seen through the transparent test. Length, 0.57 mm.; breadth, 0.27 mm. This is probably Form B, pl. iii, fig. 6.

Under the name of *Chilostomella oolina* Schwager, Heron-Allen and Earland have figured ("Discovery" Reports Foram., Falkland Islands, 1932, 360, pl. ix, fig. 38, 39) what appears to me to belong to a form very like *C. cushmani* of the stage B. Their figures also agree in point of size, measuring 0.677 mm. in length.

E 3917, r.; E 3918, v.r.; E 3923, f.

Genus PULLENIA Parker and Jones 1862

119 PULLENIA SPHAEROIDES (d'Orbigny 1826)

Nonionina sphaeroides d'Orb. 1826, 293, No. 1—Modèle No. 43.

Pullenia sphaeroides, Brady 1884, 615, pl. lxxxiv, fig. 12, 13; Chapman and Parr 1937, 110.

Of world-wide distribution, from lat. 70° N., to lat. 54° S. (Brady). In the Southern Hemisphere it ranges down to the Antarctic Ice Barrier, and is also found around the coast of New Zealand. Previous "Endeavour" material recorded it east of Tasmania, at 1,122 fathoms.

E 3915, v.r.; E 3916, v.r.; E 3920, r.

120 PULLENIA SUBCARINATA (d'Orbigny 1839)

Nonionina subcarinata d'Orbigny 1839³, 28, pl. v, fig. 23, 24.

Pullenia subcarinata, Heron-Allen and Earland 1932, 403, pl. xiii, fig. 14-18.

Originally described from the Falkland Islands by d'Orbigny, it has been generally confused with *P. quinqueloba* (Reuss), as pointed out by Heron-Allen and Earland. It remains to be seen whether the northern form differs from this species and agrees with the fossil forms of *P. quinqueloba*.

E 3916, v.r.; E 3919, v.r.; E 3920, r.

Genus SPHAEROIDINA d'Orbigny

121 SPHAEROIDINA BULLOIDES d'Orbigny 1826

d'Orbigny 1826, 267, No. 1; Modèle No. 65; Brady 1884, 620, pl. lxxxiv, fig. 1-7.

The "Aurora" dredgings containing this species were found around Tasmania. It occurs in Sample 4 of the dredgings by the "Bonthorpe" in the Great Australian Bight (Chapman and Parr).

E 3915, v.r.; E 3917, r.; E 3919, r.; E 3920, v.r.; E 3922, v.r.

Fam. ORBULINIDAE

Genus GLOBIGERINA d'Orbigny 1826

122 GLOBIGERINA BULLOIDES d'Orbigny 1826

d'Orbigny 1826, 277, No. 1, Modèles Nos. 17 and 76; Chapman and Parr 1937, 111.

A ubiquitous deep water and pelagic form.

E 3915, r.; E 3916, c.; E 3917, f.; E 3918, v.c.; E 3919, c.;
E 3920, v.c.; E 3921, f.; E 3922, v.c.; E 3923, f.

123 GLOBIGERINA CONGLOMERATA Schwager 1866

Schwager 1866, 255, pl. vii, fig. 113.

G. dubia, Brady (non Egger) 1884, 595, pl. lxxix, fig. 17 a-c.

G. conglomerata, Cushman 1927³, 172; Chapman and Parr 1937, 111.

An Eastern Pacific form agreeing with the Pliocene species of Kar Nikobar

E 3918, r.

124 GLOBIGERINA DUTERTREI d'Orbigny 1839

d'Orbigny 1839², 84, pl. iv, fig. 19-21.

This species was noted as common from the soundings by the "Aurora," extending from the Antarctic Barrier to New Zealand and Tasmania. From previous "Endeavour" material the species was found at Station 35, east of Tasmania, bottom sample, 377 fathoms; and 40 miles south of Cape Wiles, 100 fathoms.

E 3919, r.; E 3922, v.r.

125 GLOBIGERINA INFLATA d'Orbigny 1839

d'Orbigny 1839¹, 134, pl. ii, fig. 7-9.

The "Aurora" soundings contained numerous records of this species, from south of Tasmania and near Macquarie Island. It is one of the commonest of the genus in the present samples. Former "Endeavour" material contained the species as follows: Station 35, east of Tasmania, bottom sample, 377 fathoms. Station 36, ditto, 777 fathoms; east of Tasmania, 1,122 fathoms; 40 miles south of Cape Wiles, 100 fathoms.

E 3915, f.; E 3916, c.; E 3917, f.; E 3918, v.c.; E 3919, c.;
E 3920, v.c.; E 3921, v.c.; E 3922, v.c.; E 3923, v.c.

126 GLOBIGERINA PACHYDERMA (Ehrenberg 1873)

Aristerospira pachyderma Ehr. 1873, 386, pl. i, fig. 4.

Globigerina pachyderma, Brady 1884, 600, pl. cxiv, fig. 19, 20; Heron-Allen and Earland 1922, 190; Chapman and Parr 1937, 112.

From the east of Tasmania down to the Antarctic Ice Barrier.

E 3916, v.r.; E 3917, v.r.

127 GLOBIGERINA SUBCRETACEA Chapman 1902

Globigerina cretacea, Brady (non d'Orbigny) 1884, 596, pl. lxxxii, fig. 10.

G. subcretacea Chapman 1902, 410, pl. xxxvi, fig. 16 a, b; 1924, 17; Chapman and Parr 1937, 113.

G. subcretacea was originally described from Funafuti, and has since been found off the South African coast (Chapman). More lately it has been recorded from the "Aurora" soundings round Tasmania and off the Shackleton Shelf (Chapman and Parr).

E 3918, r.; E 3919, r.; E 3920, f.; E 3923, c.

Genus GLOBIGERINOIDES Cushman 1927

128 GLOBIGERINOIDES TRILOBUS (Reuss 1850)

Globigerina triloba Reuss 1850, 374, pl. xlvii, fig. 11.

G. bulloides var. *triloba*, Brady 1884, 595, pl. lxxix, fig. 1, 2; pl. lxxx, fig. 2, 3.

Present in "Aurora" samples, between Tasmania and New Zealand, south of Tasmania and in mid-ocean, north of the Antarctic Ice Barrier. Heron-Allen and Earland (1932) found this species more abundant than *G. bulloides*, in "Discovery" material from the Falkland Islands. Previously from "Endeavour" soundings (Chapman, 1915), east of Tasmania, 1,122 fathoms, and 40 miles south of Cape Wiles, 100 fathoms. E 3916, f.; E 3917, r.; E 3920, c.; E 3922, v.r.

Genus GLOBIGERINELLA Cushman 1927

129 GLOBIGERINELLA AEQUILATERALIS (Brady 1884)

Globigerina aequilateralis Brady 1884, 605, pl. lxxx, fig. 18-21.

Cushman recorded it from many Stations in the Philippines. Earlier "Endeavour" material secured this species from Station 36, east of Tasmania, 777 fathoms, and East Tasmania, 1,122 fathoms. E 3919, v.r.

Genus ORBULINA d'Orbigny 1839

130 ORBULINA UNIVERSA d'Orbigny 1839

d'Orbigny 1839², 3, pl. i, fig. 1; Brady 1884, 608, pl. lxxviii; pl. lxxxii, fig. 8-26; pl. lxxxii, fig. 1-3; Chapman and Parr 1937, 114.

Abundant in dredgings by the "Aurora," from Tasmania to the Antarctic Ice Barrier. Previous "Endeavour" records: Station 36, east of Tasmania, 777 fathoms, common; east of Tasmania, 1,122 fathoms, common; 40 miles south of Cape Wiles, 100 fathoms, common and small.

E 3915, f.; E 3917, r.; E 3918, v.c.; E 3919, v.c.
E 3920, v.c.; E 3921, v.c.; E 3922, c.; E 3923, f.

Genus PULLENIATINA Cushman 1927

131 PULLENIATINA OBLIQUILOCULATA (Parker and Jones 1865)

Pullenia obliquiloculata Parker and Jones 1865, 368, 421, pl. xix, fig. 4; Brady 1884, 618, pl. lxxxiv, fig. 16-20.

Pulleniatina obliquiloculata, Chapman and Parr 1937, 114.

This species occurred in only one sample from the "Aurora," south of Tasmania. The "Terra Nova" records were mainly round New Zealand (Heron-Allen and Earland).

E 3918, c.; E 3919, v.r.; E 3921, v.r.; E 3922, r.

Genus SPHAEROIDINELLA Cushman 1927

132 SPHAEROIDINELLA DEHISCENS (Parker and Jones 1865)

Sphaeroidina dehiscens, Brady 1884, 621, pl. lxxxiv, fig. 11; Egger 1893, 376, pl. xiii, fig. 58, 59; Chapman 1910, 418.

This species is apparently absent or very rare in cold water areas. Only one immature specimen is recorded by the "Discovery" from the Falkland Islands. It did not occur in any of the "Aurora" soundings. Cushman notes it from numerous Stations in and around the Philippines. At Funafuti it occurred at 23 Stations, mostly in very deep water, from 590 to 1,489 fathoms. Brady records it from 23 Stations in the South Pacific. Egger records it, from amongst other Stations, from Mauritius, West Australia, Timor, New Guinea and Eastern Australia. It has been found only once in the fossil state, from the Pliocene of Kar Nikobar (as *Globigerina seminulina* Schwager). E 3919, v.r.; E 3920, r.

Genus GLOBOROTALIA Cushman 1927

133 GLOBOROTALIA HIRSUTA (d'Orbigny 1839)

Rotalia hirsuta d'Orbigny 1839¹, 131, pl. i, fig. 37-39.

Globorotalia hirsuta, Chapman and Parr 1937, 115, pl. ix, fig. 24.

The "Aurora" dredgings showed a restricted distribution for this species—south and east of Tasmania and in Bass Strait, east of Adelaide.

E 3915, v.r.; E 3917, r.; E 3918, c.; E 3919, c.;
E 3920, v.c.; E 3922, f.; E 3923, f.

134 GLOBOROTALIA SCITULA (Brady 1882)

Pulvinulina scitula Brady 1882, 716.

Pulvinulina patagonica Brady (non d'Orbigny) 1884, 693, pl. ciii, fig. 7 a-c.

Pulvinulina patagonica (d'Orb.) var. *scitula*, Heron-Allen and Earland 1922, 215.

Globorotalia scitula, Chapman and Parr 1937, 116.

Common in the "Aurora" dredgings; its distribution comprises Bass Strait and south-west of Australia in the Southern Ocean, and the Antarctic Ice Barrier, off Queen Mary Land. From the previous "Endeavour" dredgings (under *Pulvinulina patagonica*), at Station 36, east of Tasmania, 777 fathoms, and east of Tasmania, 1,122 fathoms.

E 3922, f.; E 3923, v.r.

135 GLOBOROTALIA TRUNCATULINOIDES (d'Orbigny 1839)

Rotalina truncatulinoidea d'Orb. 1839¹, 132, pl. ii, fig. 25-27.

Globorotalia truncatulinoidea, Chapman and Parr 1937, 116.

From the "Aurora" it was obtained at Stations south-west of New Zealand and deeper parts of the Southern Ocean. Previous material from "Endeavour" soundings yielded it from Station 35, east of Tasmania, bottom sample, 377 fathoms; Station 36, east of Tasmania, 777 fathoms; east of Tasmania at 1,122 fathoms, and 40 miles south of Cape Wiles, 100 fathoms.

E 3916, f.; E 3917, r.; E 3918, v.c.; E 3919, v.r.;
E 3921, v.r.; E 3922, f.; E 3923, f.

Fam. NUMMULITIDAE

Genus NONION Montfort 1808

136 NONION DEPRESSULUS (Walker and Jacob 1798)

Nautilus depressulus Walker and Jacob 1798, 641, pl. xiv, 33.

Nonionina depressula, Brady 1884, 725, pl. cix, 6, 7; Chapman 1916², 70, pl. v, fig. 41.

Nonion depressulus, Chapman and Parr 1937, 99.

From the "Aurora" samples the above species was obtained in the D'Urville Sea, off the Ice Barrier; also south of Tasmania and in the deeper parts of the Southern Ocean. Heron-Allen and Earland found it in the "Discovery" samples round the Falkland Islands, where they were numerous but small.

E 3917, r.; E 3919, r.

137 NONION GRATELOUPI (d'Orbigny 1826)

Nonionina grateloupi d'Orbigny 1826, 294, No. 19; 1839², 46, pl. vi, fig. 6, 7.

Nonion grateloupi, Heron-Allen and Earland, 1932, 437, pl. xvi, fig. 9, 10.

This species occurs in the West Indies and also in the Falklands ("Discovery").

E 3920, f.

138 NONION SCAPHA (Fichtel and Moll 1798)

Nautilus scapha Fichtel and Moll 1798, 105, pl. xix, fig. d-f.
Nonionina scapha, Brady 1884, 780, pl. cix, fig. 14, 15.

The "Aurora" samples (Chapman and Parr 1937) contained the above species at two stations, east of Tasmania and off Queen Mary Land, Antarctica.
 E 3916, v.r.; E 3918, r.

139 NONION UMBILICATULUS (Montagu 1803)

Nautilus umbilicatus Montagu 1803, 191; Suppl., 78, pl. xviii, fig. 1.
Nonionina umbilicatus, Brady 1884, 726, pl. cix, fig. 8, 9.
Nonion umbilicatus, Chapman and Parr 1937, 100.

The above species occurred at the following Stations: south-east of Tasmania; between Tasmania and New Zealand; off the Ice Barrier (Wilkes Land); north of Auckland Island, 85 fathoms. Previous "Endavour" material, east of Tasmania, 1,122 fathoms. Fossil in the Lower Miocene of Victoria.

E 3915, r.; E 3922, v.r.

Genus ELPHIDIUM Montfort 1808

140 ELPHIDIUM ADVENUM Cushman 1922

Polystomella subnodosa, Brady (non Münster) 1884, 734, pl. cx, fig. a, b.
Polystomella advena, Cushman 1922, 56, pl. ix, fig. 11, 12.
Elphidium advenum Cushman 1930, 25, pl. x, fig. 1, 2.

This species, under the name of *Polystomella subnodosa*, was recorded by Brady from two "Challenger" Stations south-west of New Guinea, viz., Station 187, off Booby Island, 6-8 fathoms, and Station 188, closely adjacent, at 28 fathoms. Cushman recorded it, under the same name as Brady, at 13 Stations in the Philippines.

E 3915, c.; E 3916, v.r.; E 3917, v.r. E 3918, f.;
 E 3919, r.; E 3922, v.r.; E 3923, v.r.

141 ELPHIDIUM CRISPUM (Linné 1767)

Nautilus crispus Linné 1767, 1,162; 1788, 3,370.
Polystomella crista, Brady 1884, 736, pl. cx, fig. 6, 7; Cushman 1921, 368.
Elphidium crispum, Chapman and Parr 1937, 100.

Recorded from the Subantarctic Islands, New Zealand, and off Kerguelen Island. Fairly common in the dredgings by the trawler "Bonthorpe," from West Australia. Previous "Endavour" dredgings found it 40 miles south of Cape Wiles, 100 fathoms, where it was frequent.

E 3923, v.r.

142 ELPHIDIUM IMPERATRIX (Brady 1884)

Polystomella imperatrix Brady 1884, 738, pl. cx, fig. 13-15.

Brady's figured types were, fig. 13, 14, from Storm Bay, Tasmania, and fig. 15, from Station 163B, Port Jackson, 2-10 fathoms (*vide* Nuttall).

E 3915, r.; E 3918, f.; E 3919, f.

143 ELPHIDIUM JENSENI (Cushman 1924)

Polystomella jenseni Cushman 1924, 49, pl. xv, ?4, 6.
Polystomella macella (F. and M.) var., Jensen 1905, 817, pl. xxiii, fig. 4.

Cushman's specimens were dredged at Samoa. Jensen's original examples came from 100 fathoms off Wollongong, New South Wales.

E 3920, v.r.

144 ELPHIDIUM LESSONII (d'Orbigny 1826)

Polystomella lessonii d'Orbigny 1826, 284, No. 6; 1839³, 29, pl. iii, fig. 1, 2.

Elphidium lessonii, Cushman 1930, 22, pl. ix, fig. 1-4; Heron-Allen and Earland 1932, 44, pl. xvi, fig. 29, 30.

d'Orbigny's specimens came from Patagonia and the Falkland Islands.

E 3917, r.; E 3918, v.r.; E 3922, f.

145 ELPHIDIUM MACELLUM (Fichtel and Moll 1798)

Nautilus macellus F. and M. 1798, 66, pl. x, fig. e-k.

Polystomella macella, Brady 1884, 737, pl. cx, fig. 8, 9, 11.

Elphidium macellum, Chapman and Parr 1937, 101.

The "Aurora" samples came from east of Tasmania. Previous "Endeavour" material occurred at Station 36, east of Tasmania, 777 fathoms, and from 40 miles south of Cape Wiles, 100 fathoms.

E 3920, r.; E 3921, v.r.; E 3922, r.

146 ELPHIDIUM POEYANUM (d'Orbigny 1839)

Polystomella poeyana d'Orbigny, 1839², 55, pl. iv, fig. 25, 26; Cushman 1922, 55, pl. ix, fig. 9, 10.

This species has been described from Cuba and Jamaica; also from Florida.

E 3920, r.

147 ELPHIDIUM VERRICULATUM (Brady 1884)

Polystomella verriculata Brady 1884, 738, pl. cx, fig. 12 a, b.; Chapman 1907, 142, pl. x, fig. 10.

Elphidium verriculatum, Chapman and Parr 1937, 101.

Brady records this species from Moncoeur Island, Bass Strait, at 38 fathoms, and according to Nuttall this is the type locality. Brady also gives Curtis Strait, Queensland, which, however, does not appear in the list of Stations, but would inferentially be of not very deep water. Other localities for this species are the Malay Archipelago, Sagami Bay, Japan and from shore sand, Beaumaris, Port Phillip, Victoria. Jensen notes it from Lizard Island, Great Barrier Reef, Queensland; whilst Goddard and Jensen obtained it from Palm Island, Townsville, at 15 fathoms. The exceptional depths recorded for this species, of 1,320 and 1,300 fathoms, were from samples dredged by the "Aurora" to the east of Tasmania; it is usually considered a shallow water form.

E 3915, v.c.; E 3918, v.r.; E 3922, v.r.; E 3923, r.

Superfam. AMMODISCOIDEA

Fam. HYPERAMMINIDAE

Genus HYPERAMMINA Brady 1878

148 HYPERAMMINA NOVAEZEALANDIAE Heron-Allen and Earland 1922

Technitella mestayeri, Cushman 1919, 595, pl. lxxiv, fig. 4.

Hyperammina novaezealandiae Heron-Allen and Earland 1922, 89, pl. iii, fig. 1-5.

Heron-Allen and Earland obtained this species in "Terra Nova" dredgings, 7 miles east of North Cape, New Zealand.

E 3920, r.

Fam. SACCAMMINIDAE

Genus SACCAMMINA M. Sars 1869

149 SACCAMMINA SPHAERICA Sars 1872

G. O. Sars 1872, 250; Brady 1884, 253, pl. xviii, fig. 11-17; Chapman 1916², 61, pl. ii, fig. 12; Heron-Allen and Earland 1922, 85, pl. i, fig. 16; Chapman and Parr 1937, 161.

This bipolar species has been shown, by the investigations of the "Challenger" at the Antarctic Ice Barrier, to be almost as equally abundant in Antarctic Seas as in the North Atlantic. From the "Nimrod" gatherings (Shackleton Expedition) I obtained it from the Ross Sea; whilst from the soundings of the "Terra Nova" (Scott Expedition) Heron-Allen and Earland recorded it as occurring on the east coast of New Zealand and off the Ice Barrier. The "Aurora" records (Mawson 1911-14) were off Wilke's and Adelie Land. The present example is small, white, globular with a short neck and composed of minute, irregularly-sized quartz grains.

E 3915, v.r.

Genus PELOSINA Brady 1879

150 PELOSINA CYLINDRICA Brady 1884

Brady 1884, 236, pl. xxvi, fig. 1-6; Chapman and Parr 1937, 162.

It is interesting to find this species ranging into lower latitudes of the Southern Ocean, for it was formerly known as occurring off the Ice Barrier and off the east coast of New Zealand. The "Aurora" obtained it to the east of Tasmania.

E 3915, f.

Genus BRACHYSIPHON Chapman 1906

151 ? BRACHYSIPHON CORBULIFORMIS Chapman 1906

Chapman 1906, 84, pl. iii, fig. 2 a, b, 3.

Two examples, referable to the above species, were found. These are sub-spherical, open at one end in the smaller and at both ends in the larger specimen. Test composed of small foraminiferal shells mingled with broken spicules of sponge. Diameter of larger specimen twice that of the type from New Zealand. Orifice in both nearly circular, with internal margin smooth.

E 3915, r.

Genus TECHINITELLA Norman 1878

152 TECHINITELLA cf. LEGUMEN Norman 1878

Norman 1878, 279, pl. xlvi, fig. 3, 4.

This species has been recorded from, amongst other localities, Kerguelen Islands, 120 fathoms; off Sydney, 410 fathoms; the Society Islands and Fiji. Also from the North and South Atlantic.

E 3915, v.r.

Fam. ASTRORHIZIDAE

Genus RHABDAMMINA M. Sars 1869

153 RHABDAMMINA DISCRETA Brady 1884

Brady 1884, 268, pl. xxii, fig. 7-10.

Recorded off Kerguelen Island, 120 fathoms. Also in the North and South Atlantic and the Pacific Ocean. As the cooler waters of the north and south poles are approached, the habitat of the species decreases in depth.

E 3918, f.; E 3919, v.r.; E 3920, v.c.; E 3921, v.r.

154 RHABDAMMINA IRREGULARIS W. B. Carpenter 1869

Carpenter 1869, 60; Brady 1884, 268, pl. xxi, fig. 9; Cushman 1918, 17, pl. viii, fig. 1.

Nornan obtained this form from the Bay of Biscay. It has also been found off the West Coast of Australia and in the Pacific. E 3920, v.r.

Fam. OPTHALMIDIIDAE

Genus CORNUSPIRA Schultze 1854

155 CORNUSPIRA FOLIACEA (Philippi 1844)

Orbis foliacea Philippi 1844, 147, pl. xxiv, fig. 26.

Cornuspira foliacea, Brady 1884, 199, pl. xi, fig. 5-9; Cushman 1921, 387, pl. lxxvii, fig. 1.

This species is common to a fauna extending from Japan, the Philippines and the South Seas, the extremity of which area includes Tasmanian shores and Bass Strait. A large specimen, 6 mm. in diameter. E 3915, v.r.

156 CORNUSPIRA FOLIACEA (Philippi 1844) var. EXPANSA Chapman 1915

Cornuspira carinata (Costa) var. *expansa* Chapman 1915, 12, pl. i, fig. 3.

Cornuspira foliacea (Phil.) var. *expansa*, Cushman 1919, 633.

C. foliacea (Phil.) var. *expansa*, Cushman 1921, 388, pl. lxxvii, fig. 2.

In 1921 Cushman pointed out that my variety *expansa* belonged to *C. foliacea*, a typical *Cornuspira* of the Philippines. Although my specific determination of *C. carinata*, to which *expansa* was referred, was based on Brady's figure of Costa's species, in deference to Cushman's close acquaintance with the Philippine foraminiferal fauna I accept this view of the case. Cushman had already discovered my variety in the New Zealand fauna, from the east coast, at Poor Knights Islands. In previous "Endeavour" material, two examples from 40 miles south of Cape Wiles, 100 fathoms. E 3919, v.r.

157 CORNUSPIRA LACUNOSA Brady 1884

Brady 1884, 202, pl. cxiii, fig. 1.

Recorded from Torres Strait (type locality), and rarely in the Philippines and off Japan (Cushman). E 3915, v.r.

158 CORNUSPIRA STRIOLATA Brady 1884

Brady 1884, 202, pl. cxiii, fig. 18, 19; Chapman 1907, 23, pl. iii, fig. 47.

The type locality is Farøe Channel (cold area), 540 fathoms. Howchin, in 1889 (Trans. Roy. Soc. S. Aust., 12, 4), regarded this species as a variety of *C. foliacea*, with its structure presumably brought out by weathering. This was the first note on the occurrence of this interesting species, living elsewhere, as an Australian Lower Miocene fossil.

When describing the above as a fossil species in 1907, I remarked that "the doubts relating to their specific identification were removed," and further noted "its strictly northern distribution in the living condition." Since then it has been recorded also in the living condition in the Southern Hemisphere in two instances: (1) By Heron-Allen and Earland, in "Terra Nova" samples, off South Victoria Land (Station 339), where one specimen reached the dimensions of the enormous tests found in the cold area of the Farøe Channel, namely, 21 mm. x 19 mm.; (2) in the present series, east of Babel Island, Flinders Island, Bass Strait.

E 3915, v.r.

Genus OPHTHALMIDIUM Zwingli and Kübler 1870

159 OPHTHALMIDIUM CIRCULARIS (Chapman 1915)

Spiroloculina dorsata Reuss var. *circularis* Chapman 1915, 7, pl. i, fig. 1.

Previously obtained from "Endeavour" dredgings, Station 36, east of Tasmania, 777 fathoms.

E 3918, v.r.

Genus PLANISPIRINA Seguenza 1880

160 PLANISPIRINA BUCCULENTA (Brady 1884)

Miliolina bucculenta Brady 1884, 170 pl. cxiv, fig. 3 a, b; Heron-Allen and Earland 1922, 65.

Planispirina bucculenta, Schlumberger 1892, 194, pl. viii, fig. 6, 7; Chapman 1909, 324, 14, pl. xiv, fig. 2; Chapman 1916¹, 42, pl. v, fig. 4; Heron-Allen and Earland 1932, 322; Chapman and Parr 1937, 129.

This species is fairly abundant and often of large size in southern waters; notably near the Subantarctic Islands of New Zealand, near the Western Base, Shackleton Shelf ("Aurora"), Falkland Islands ("Discovery")—small specimens, and from the upthrust muds on Mount Erebus ("Nimrod").

E 3915, r.; E 3918, f.; E 3919, f.; E 3923, c.

161 PLANISPIRINA BUCCULENTA var. PLACENTIFORMIS (Brady 1884)

Miliolina bucculenta var. *placentiformis* Brady 1884, 71, pl. iv, fig. 1, 2.

Planispirina bucculenta var. *placentiformis*, Chapman 1916¹, 43, pl. v, fig. 5.

Found in upthrust muds on Mount Erebus.

E 3918, r.; E 3923, c.

Fam. MILIOLIDAE

Genus QUINQUELOCULINA d'Orbigny 1826

162 QUINQUELOCULINA AUBERIANA d'Orbigny 1839

d'Orbigny 1839², 193, pl. xii, fig. 1-3.

A small and rather contorted form of *Q. lamarckiana* d'Orb. Also cf. *Q. contorta* d'Orb., which was recorded from previous "Endeavour" samples; Station 36, east of Tasmania, 777 fathoms. E 3919, r.; E 3922, v.r.; E 3923, r.

163 QUINQUELOCULINA AUSTRALIS Parr 1932

Parr 1932, 7, pl. 1, fig. 8 a-c.

Having a more compressed test and marginal keel, as compared with the northern *Q. subrotunda* (Montagu). Recorded as the latter from former "Endeavour" material, 40 miles south of Cape Wiles, 100 fathoms. E 3919, r.

164 QUINQUELOCULINA CRASSA d'Orbigny 1826

d'Orbigny 1826, 301, No. 14; Fornasini 1905, 65, pl. iii, fig. 5.

Test suborbicular, swollen and finely striated. Occurred in several samples of dredgings by the trawler "Bonthorpe" in the Great Australian Bight.

E 3915, v.r.

165 QUINQUELOCULINA CUVIERIANA d'Orbigny 1839

d'Orbigny 1839², 190, pl. xi, fig. 19-21.

Miliolina cuvieriana, Brady 1884, 162, pl. v, fig. 12 a-c.

Periphery sharply keeled. In shore sand, Victoria, Papua and the Philippines. From previous "Endeavour" material, 40 miles south of Cape Wiles, 100 fathoms. Common as a Lower Miocene fossil in Victoria.

E 3915, r.; E 3917, v.r.; E 3918, v.r.

166 QUINQUELOCULINA LAMARCKIANA d'Orbigny 1839

d'Orbigny 1839², 164, pl. ix, fig. 14, 15.

A common species in shore sands in Victoria. Distinguished by its sharp periphery.

E 3915, f.; E 3917, v.r.; E 3920, r.; E 3921, v.r.; E 3922, v.r.; E 3923, f.

167 QUINQUELOCULINA SEMINULUM (Linn. 1767)

Serpula seminulum Linn. 1767, ed. xii, 1,264, No. 791.

Miliolina seminulum, Brady 1884, 157, pl. v, fig. 6.

One of the commonest miliolines, in shore sands on the coast of Victoria.

E 3917, v.r.; E 3923, f.

168 QUINQUELOCULINA VULGARIS d'Orbigny 1826

d'Orbigny 1826, 302, No. 33; Schlumberger 1893, 65, (207), pl. ii, fig. 65, 66, woodcuts 13, 14.

Recorded from previous "Endeavour" material, 40 miles south of Cape Wiles, 100 fathoms. Abundant and rather small. Abundant as a Lower Miocene fossil in Victoria.

E 3915, c.; E 3916, v.r.; E 3918, c.; E 3919, c.;
E 3920, r.; E 3922, v.r.; E 3923, r.

Genus SPIROLOCULINA d'Orbigny 1826

169 SPIROLOCULINA CANALICULATA d'Orbigny 1846

d'Orbigny 1846, 269, pl. xvi, fig. 10-12; Cushman 1921, 395, pl. lxxx, fig. 3, a, b; Chapman 1915, 6.

Spiroloculina impressa, Brady 1884 (non Terquem), 151, pl. x, fig. 3, 4.

Common in the Philippines, usually at less depth than 100 fathoms. From previous "Endeavour" material 40 miles south of Cape Wiles, 100 fathoms, abundant.

E 3915, c.; E 3918, r.; E 3919, r.; E 3923, f.

Genus SIGMOILINA Schlumberger 1887

170 Sigmoidina latissima sp. nov.

(Pl. viii, fig. 8)

Description—Test broadly ovate, complanate, with surface encrusted by cement and fine sand. Exterior showing slight undulations indicating the sigmoidine arrangement of the interior. Contour not so tumid as in *S. schlumbergeri* Silvestri, nor so spiroloculine as in ? *Spiroloculina arenaria* Brady. Aperture small, at the end of a short tube, but as long as in the latter form, with which, however, it may be related. Length, 1.83 mm.; breadth, 1.6 mm.; thickness, 0.44 mm.

E 3918, r.; E 3919, f.

171 SIGMOILINA SCHLUMBERGERI Silvestri 1904

Planispirina celata, Brady (non Costa) 1884, 197 pl. viii, fig. 1-4.

Sigmoidina schlumbergeri Silvestri 1904, 267; Chapman 1915, 317; Cushman 1921, 449.

Previous "Endeavour" material contained this species at Station 36, east of Tasmania, 777 fathoms, frequent; and east of Tasmania, 1,122 fathoms.

E 3922, v.r.; E 3923, v.r.

Genus PTYCHOMILIOLA Eimer and Fickert 1899

172 PTYCHOMILIOLA SEPARANS (Brady 1881)

Miliolina separans Brady 1881, 45; 1884, 175, pl. vii, fig. 1-4.

This species has previously been recorded from Raines Island, Torres Strait, Booby Island, New Guinea, and Storm Bay, Tasmania.

E 3915, r.

Genus TRILOCULINA d'Orbigny 1826

173 TRILOCULINA CHRYSOSTOMA (Chapman 1909)

Miliolina chrysostoma Chapman 1909, 322, pl. xiii, fig. 8-10; pl. xiv, fig. 1-4.

These show an extremely variable series, ranging from ovate to bi- and triloculine modifications. The oral septum is plate-like or feebly T-shaped. Found off the Snares at 60 fathoms; 20 miles north; and 10 miles north of Enderby Island, 85 fathoms.

E 3919, v.r.

174 TRILOCULINA CIRCULARIS Bornemann 1855

Bornemann 1855, 349, pl. xix, fig. 4; Cushman 1921, 462, pl. xcii, fig. 1, 2.

Miliolina circularis, Brady 1884, 169, pl. iv, fig. 3 a-c; pl. v, fig. 13.

A common species in the Indo-Pacific, and in the dredgings by the "Bonthorpe" off the Great Australian Bight. Previous "Endeavour" soundings recorded this species 40 miles south of Cape Wiles, 100 fathoms; small but very abundant.

E 3923, f.

175 TRILOCULINA QUADRILATERALIS d'Orbigny 1839

d'Orbigny 1839², 173, pl. ix, fig. 14-16 (*quadrilatera* on pl.).

This form resembles *Q. auberiana* but is triloculine and with straight sides. The type locality is the West Indies.

E 3920, v.r.; E 3921, v.r.; E 3922, v.r.

176 TRILOCULINA TRICARINATA d'Orbigny 1826

d'Orbigny 1826, 7, 299, No. 7, Modèle, 94.

Miliolina tricarinata, Brady 1884, 165, pl. iii, fig. 17 a, b.

Its distribution extends from Franz Josef Land in the north to the Antarctic Ice Barrier in the south. Found in shallow water on the Victorian coast. As a fossil it ranges through the Tertiary and is frequent in the bores in Victoria. Previous "Endeavour" material yielded this species as follows: 40 miles south of Cape Wiles, 100 fathoms, and east of Tasmania, 1,122 fathoms.

E 3915, f.; E 3919, v.r.; E 3920, r.

177 TRILOCULINA TRIGONULA (Lamarck 1804)

Miliolites trigonula Lamarck 1804, 351, No. 3; 1822, 612, No. 3.

Triloculina trigonula, d'Orbigny 1826, 299, No. 1, pl. xvi, fig. 5-9.

Miliolina trigonula, Brady 1884, 164, pl. iii, fig. 14-16.

A widely distributed species, extending even to the Antarctic, but there very small. The largest forms occur in tropical waters. Also as a fossil from earliest Tertiary time. Previous "Endeavour" material yielded one rather large specimen from 40 miles south of Cape Wiles, 100 fathoms.

E 3915, r.; E 3917, v.r.

Genus MILIOLINELLA Wiesner 1931

178 MILIOLINELLA OBLONGA (Montagu 1803)

Vermiculum oblongum Montagu 1803, 522, pl. xiv, fig. 9.

Triloculina oblonga, d'Orb. 1839², 175, pl. x, fig. 3-5; Chapman and Parr 1937, 134

Miliolina oblonga, Brady 1884, 160, pl. v, fig. 4 a, b.

A widely distributed species from the North Sea to the Antarctic. A bipolar form.

E 3915, v.r.; E 3916, v.r.; E 3918, v.r.; E 3922, v.r.

Genus PYRGO Defrance 1824

179 PYRGO COMATA (Brady 1881)

Biloculina comata Brady 1881, 45; 1884, 144, pl. iii, fig. 9 *a, b*; Schlumberger 1891, 565, text-fig. 26-28, pl. x, fig. 72, 73; Cushman 1921, 477, pl. xcvi, fig. 3 *a, b*.

Amongst Brady's localities for this rare species are: off Sydney, 410 fathoms; north of New Guinea, 1,070 fathoms; and off Pernanibuco, 350 fathoms. Cushman records *B. comata* from several Stations in the Philippines, and also from the east coast of New Zealand. Schlumberger's specimens came from the Gulf of Gascony and the Skagerak.

E 3919, v.r.

180 PYRGO ELONGATA (d'Orbigny 1826)

Biloculina elongata d'Orbigny 1826, 298, No. 4; Brady 1884, 144, pl. ii, fig. 9 *a, b*; Schlumberger 1891, 571, text-fig. 35, 36; pl. xi and xii, fig. 87-89; Chapman 1907, 15, pl. i, fig. 14; Cushman 1921, 473, pl. xcv, fig. 4 *a, b*.

Abundant in the North and South Pacific (Brady). Schlumberger's specimens came from the Mediterranean. Previous "Endeavour" material contained this species from Station 36, east of Tasmania, 777 fathoms. This species occurs as a fossil in the Lower Miocene and Pliocene of Victoria.

E 3919, r.; E 3920, v.r.; E 3921, v.r.; E 3923, v.r.

181 PYRGO FORNASINII Chapman and Parr 1935

Biloculina ringens, Brady (non *Miliolites ringens* Lamarck) 1884, 142, pl. ii, fig. 7. *Biloculina bradyi*, Schlumberger (non Fornasini) 1891, 170, text-fig. 15-19, pl. x, fig. 63-71.

Pyrgo fornasinii Chapman and Parr 1935, 5.

The trivial name for this species, having been pre-occupied by Fornasini, necessitated the above change of name. The original specimen figured by Brady came from the West Indies (*fide* Nuttall). Those figured by Schlumberger were dredged in the Gulf of Gascony, Coast of Morocco. The Australian examples were dredged by the trawler "Bonthorpe" in the Great Australian Bight. The species was also met with in "Endeavour" dredgings (1915), when I described it under the name of *Biloculina bradyi* Schl., from 40 miles south of Cape Wiles at 100 fathoms. It has also been dredged from the area around the Subantarctic Islands of New Zealand. As a fossil it is found in the Lower Miocene Tertiaries of Port Phillip (Chapman).

E 3915, f.; E 3918, v.r.

182 PYRGO Sarsi (Schlumberger 1891)

Biloculina ringens, Brady pars (non Lamarck) 1884, 139.

Biloculina sarsi Schlumberger 1891, 551, text-fig. 10-12, pl. ix, fig. 55-59; Chapman 1907, 14, pl. i, fig. 1, 2.

The type locality for the above, as given by Schlumberger, is the North Sea, between Norway and Greenland. Brady does not specifically figure it, but it comes from the same "Biloculina Clay" discovered by G. O. Sars of Christian and described by him in his official report on the Norwegian Sea-fisheries for the year 1876. It has been recorded by me from the Subantarctic Islands of New Zealand, and from previous "Endeavour" dredgings, 40 miles south of Cape Wiles. The species has also been found in the Lower Miocene of Victoria.

E 3918, v.r.; E 3922, v.r.; E 3923, r.

183 PYRGO VESPERTILIO (Schlumberger 1891)

Biloculina vespertilio Schlumberger 1891, 561, pl. x, 74-76, text-fig. 20-22.

Biloculina ringens, Brady (non *Miliolites ringens* Lamarck) 1884, 142, pl. ii, fig. 8;

Chapman 1909², 315, pl. xiii, fig. 4 *a, b*; Cushman 1917, 77, pl. xxx, fig. 1.
Pyrgo vespertilio, Chapman and Parr 1937, 142, pl. ii, fig. 8.

Schlumberger's specimens came from the Gulf of Gascony. Cushman has noted it off the coast of Japan at 258 fathoms, and it has occurred around the Subantarctic Islands of New Zealand (Chapman) and in "Aurora" dredgings southwest of Tasmania (Chapman and Parr) E 3919, v.r.

Genus PYRGOELLA Cushman and White 1936

184 PYRGOELLA SPHAERA (d'Orbigny 1839)

Biloculina sphaera d'Orbigny 1839³, 66, pl. viii, fig. 13-16; Brady 1884, 141, pl. ii, fig. 4 *a, b*.

Planispirina sphaera, Schlumberger 1891, 377, text-fig. 45, 46; Chapman 1906, 82, pl. iii, fig. 1 *a, b*; Heron-Allen and Earland 1932, 322, pl. vi, fig. 41, 42.

Pyrgoella sphaera, Cushman and White 1936, 90.

The South American type of d'Orbigny's *Biloculina sphaera* shows a similar labyrinthic aperture to one found off Great Barrier Island, New Zealand (Chapman 1906). Schlumberger's specimens came from the Gulf of Gascony. Heron-Allen and Earland's Antarctic examples came from the Falkland Islands and South Georgia. E 3915, f.; E 3918, f.; E 3920, v.r.; E 3923, v.r.

Genus BILOCULINELLA Wiesner 1931

185 BILOCULINELLA GLOBULUS (Bornemann 1855)

Biloculina globulus Bornemann 1855, 349, pl. xix, fig. 3; Schlumberger 1891, 575, text-fig. 42-44, pl. xii, fig. 97-100; Chapman 1907, 15, pl. i, fig. 17, 18.

Pyrgo globulus, Chapman and Parr 1937, 137.

This species was found in the Antarctic ("Aurora" dredgings), near the Western Base, off Queen Mary Land, specimens frequent. Cushman records it from the Philippines, at eleven different Stations. It was found as a fossil in the Lower Miocene of Port Phillip, Victoria. E 3915, f.; E 3916, v.r.; E 3919, v.r.

Fam. LITUOLIDAE

Genus HAPLOPHRAGMOIDES Cushman 1910

186 HAPLOPHRAGMOIDES EMACIATUS (Brady 1884)

Haplophragmium emaciatum Brady 1884, 305, pl. xxxiii, fig. 26-28; Heron-Allen and Earland 1922, 98.

Haplophragmoides emaciatum, Cushman 1910, 102, text-fig. 150-152; 1920, 40, pl. viii, fig. 4, text-fig. 1-3.

Haplophragmoides emaciatum, Chapman and Parr 1937, 139.

Brady recorded this species from the West Indies. It has recently been found in the Antarctic, off Adele Land, Queen Mary Land, east of Tasmania and to the south of New Zealand, in dredgings from the "Aurora." E 3918, v.r.

187 HAPLOPHRAGMOIDES GRANDIFORMIS Cushman

Cushman 1910, 440, text-fig. 11; 1921, 82, pl. xi, fig. 2.

Cushman described this species from the China and Molucca Seas. It has been lately recorded in "Bonthorpe" material from the Great Australian Bight.

E 3915, c.; E 3918, v.r.

Genus RECURVOIDES Earland 1934

188 RECURVOIDES CONTORTUS Earland 1934

Earland 1934, 91, pl. x, fig. 7-19; Chapman and Parr 1937, 138, pl. ix, fig. 34 *a, b*.

First described from the Falklands Sector of the Antarctic ("Discovery"). Chapman and Parr did not find it north of latitude 60° ("Aurora"); it was commonest at 150-300 fathoms. Its greatest depth was 1,550 fathoms. The present occurrence, 33 miles east from Green Cape, is a great distance from its hitherto known habitat.

E 3922, r.

Genus AMMOBACULITES Cushman 1910

189 AMMOBACULITES AGGLUTINANS (d'Orbigny 1846)

Spirolina agglutinans d'Orbigny 1846, 137, pl. vii, fig. 10-12.

Haplophragmium agglutinans, Brady 1884, 301, pl. xxxii, fig. 19, 20, 24-26; Heron-Allen and Earland 1922, 97.

Ammobaculites agglutinans, Cushman 1920, 60, pl. xii, fig. 3; Chapman and Parr 1937, 142, pl. x, fig. 37.

A well-distributed species. It occurs sparingly off the Antarctic Ice Barrier ("Aurora"). It was originally described from the Tertiary of the Vienna Basin.

E 3919, v.r.

Fam. REOPHACIDAE

Genus REOPHAX Montfort 1808

190 REOPHAX DENTALINIFORMIS Brady 1884

Brady 1884, 293, pl. xxx, fig. 21, 22; Chapman and Parr 1937, 147.

This species has been recorded from the Ross Sea ("Nimrod") and from the Antarctic by the "Terra Nova." The "Aurora" dredged it from the Antarctic and from east of Tasmania.

E 3919, r.

191 REOPHAX DISTANS var. PSEUDODISTANS Cushman 1919

Reophax spiculifera Brady var. *pseudodistans* Cushman 1919, 598, pl. lxxv, fig. 1.

Reophax distans var. *pseudodistans*, Heron-Allen and Earland 1932, 338, pl. vii, 17-20.

From the "Discovery" soundings around the Falkland Islands. The present, Green Cape, locality is remote from the earlier one.

E 3920, v.r.

192 REOPHAX SCORPIURUS Montfort 1808

Montfort 1808, 330, 83 genre; Brady 1884, 291, pl. xxx, fig. 12-17; Chapman and Parr 1937, 149.

Found off the Ice Barrier and commonly around the Australian coast. The species was dredged by the trawler "Bonthorpe" off the Great Australian Bight.

The previous "Endcavour" record for this species is 40 miles south of Cape Wiles, 100 fathoms.

E 3928, r.

Fam. TEXTULARIIDAE

Genus TEXTULARIA DeFrance, 1824

193 TEXTULARIA CONICA (d'Orbigny 1839)

d'Orbigny 1839², 135, pl. i, fig. 19, 20; Brady 1884, 365, pl. xliii, fig. 13, 14; pl. cxiii, fig. 1 *a, b*.

Heron-Allen and Earland recorded this species from east of North Cape, New Zealand ("Terra Nova"). It has also occurred off the Great Australian Bight ("Bonthorpe"). E 3915, c.

194 TEXTULARIA CORRUGATA Heron-Allen and Earland 1915

Textularia conica d'Orbigny, var. *corrugata* Heron-Allen and Earland 1915, 629, pl. xlvii, fig. 24-27

Textularia corrugata, Cushman 1932, 12, pl. iii, fig. 2, 4.

This form was first described from the Kerimba Archipelago. Cushman also records it from the Fijis at 40-50 fathoms; off Rougelap Atoll, Marshall Islands; and from Guam Anchorage, Ladrone Islands at 21 fathoms. E 3915, f.

195 TEXTULARIA PSEUDOGRAMEN Chapman and Parr 1937

Textularia gramen, Brady (non d'Orbigny) 1884, 365, pl. xliii, fig. 10.

Textularia pseudogramen Chapman and Parr 1937, 153.

Common on the Australian coast. It is recorded in the list of the "Bonthorpe" Foraminifera, 1935. This species was identified in the previous "Endeavour" material (1915) as *Spiroplecta gramen* (d'Orb.) at Station 36, east of Tasmania, 777 fathoms; and also from 40 miles south of Cape Wiles, 100 fathoms. E 3915, c.; E 3919, v.r.; E 3923, v.r.

196 TEXTULARIA SAGITTULA Defrance 1824

Defrance 1824, 177. Atlas Conch., pl. xiii, fig. 5; Chapman and Parr 1937, 154

This species is common on the Australian coast. The "Terra Nova" dredged it from the New Zealand area. In the previous material from the "Endeavour" it was recorded, as *Spiroplecta sagittula*, from 40 miles south of Cape Wiles, 100 fathoms. E 3915, r.; E 3917, v.r.; E 3918, r.; E 3919, r.; E 3923, f.

Fam. TROCHAMMINIDAE

Genus TROCHAMMINA Parker and Jones 1859

197 TROCHAMMINA PLANOCONVEXA Chapman and Parr 1937

Chapman and Parr 1937, 158, pl. x, fig. 45.

In the above original reference the distribution of the species is given as confined to the Shackleton Shelf, from 250-358 fathoms. E 3922, v.r.

Fam. VALVULINIDAE

Genus CLAVULINA d'Orbigny 1826

198 CLAVULINA SERVETIYI Chapman and Parr 1935

Chapman and Parr 1935, 5, pl. i, fig. 7 a, b.

The original specimens were dredged by the trawler "Bonthorpe" from the Great Australian Bight (Sample 6, 170 fathoms). Recorded from previous "Endeavour" dredgings as *Clavulina parisiensis* d'Orb. from 40 miles south of Cape Wiles, 100 fathoms, common. E 3915, r.; E 3917, r.

Genus DOROTHIA Plummer 1931

199 DOROTHIA ARENATA Cushman 1936

Cushman 1936, 32, pl. v, fig. 11 a-c.

This species was described from the "Albatross" dredgings off Mindanao, Philippines, in 490 fathoms. To find this species so far south is of great interest.

E 3915, c.; E 3919, v.r.

200 DOROTHIA SCABRA (Brady 1884)

Brady 1884, 381, pl. xlv, fig. 7; Cushman 1921, 146, pl. xxviii, fig. 5.

Localities for this species are Luzon, Bornco, north of Celebes, and Macassar Strait.

E 3915, r.

Genus LISTERELLA Cushman 1933

201 LISTERELLA sp.

This species will be shortly described from the Mawson Antarctic dredgings, 1929-31.

E 3915, v.r.

Fam. VERNEUILINIDAE

Genus GAUDRYINA d'Orbigny 1839

202 GAUDRYINA ROBUSTA Cushman 1913

Cushman 1913, 636, pl. lxxviii, fig. 2; 1937, 67, pl. ix, fig. 15.

This species was described from the "Albatross" dredgings, Gulf of Tomini, Celebes, at 750 fathoms.

E 3915, v.r.; E 3922, v.r.

203 GAUDRYINA TRIANGULARIS Cushman 1911

Cushman 1911, 65, text-fig. 104; 1937, 66, pl. ix, fig. 16.

Recorded from the Poor Knights Islands, east coast of New Zealand; also east of Mesbate Island, Philippines, 108 fathoms. As *Gaudryina rugosa* d'Orb. it was recorded from previous "Endeavour" material (1915, 16), from 40 miles south of Cape Wiles, 100 fathoms.

E 3915, f.

Subphyl. CRUSTACEA

Class OSTRACODA

Fam. CYPRIDAE

Genus PONTOCYPRIS G. O. Sars 1865

1 PONTOCYPRIS BRADYI nom. mut.

(Pl. viii, fig. 1)

Pontocypris faba G. S. Brady (non Reuss 1855) 1878, 382, pl. lxiii, fig. 6 a-c; G. S. Brady 1880, 37, pl. i, fig. a-d; Chapman 1916, 71, pl. iv, fig. 45 a, b.

In 1855 Reuss figured an ostracod from the Chalk of England as *Bairdia faba* (Zeitschr. d. Geol. Gesellsch., 278, pl. x, fig. 2), which I consider he correctly placed in that genus. Reuss states that the material from which he obtained this form came from Charing, in Kent, England. The only one likely to supply Reuss with that local material would have been my old friend and fellow worker, Professor T. Rupert Jones. From the same source I have also a fairly large quantity of Charing washings, and so was able to search for a topotype. Upon examining this material, which I fortunately brought with me to Australia, I found definite examples of a form agreeing with Reuss' original figures. Brady himself made only a provisional comparison with Reuss' species and usually queried it. A careful comparison of the topotypes with Brady's Crag specimens shows that the anterior of the latter is broader than that of the Chalk fossils (*Bairdia faba*).

Specimens similar to *Pontocypris bradyi* have been obtained by the "Challenger" off East Moncoeur Island, Bass Strait, 38-40 fathoms, and off reefs, Honolulu, 40 fathoms.

E 3916, v.r.; E 3917, v.r.; E 3918, r.; E 3920, v.r.

2 PONTOCYPRIS ATTENUATA G. S. Brady 1868

(Pl. ix, fig. 8)

Brady 1868, 179, pl. iv, fig. 11-14, Idem, 1880, 38, pl. xv, fig. 2 *a-d*, Idem, 1890, 491, pl. i, fig. 3, 4; Chapman 1919, 17.

Brady points out, in his South Sea Ostracod Memoir that the original figures were based on young examples; those of the full-grown specimens, from the South Seas (and incidentally our present ones), being armed at the posterior ventral angle with a single short and stout spine. The original types came from Mauritius, whilst it was later noted from New Caledonia and the Fiji Islands. It also occurred at Funafuti, in the deeper dredgings by H.M.S. "Penguin," at 1,215 fathoms.

E 3919, r.

3 PONTOCYPRIS SIMPLEX G. S. Brady 1880

G. S. Brady 1880, 37, pl. i, fig. 5 *a-d*; Egger 1901, 421, pl. i, fig. 1-3; Chapman 1919, 18, pl. xi, fig. 2, 2 *a*.

This species was previously recorded from Ascension Island, at 7 fathoms. It also occurred in "Aurora" dredgings, west of Tasmania, at 1,300 fathoms. Egger found it at Station 9 ("Gazelle"), off North-West Australia, 357 metres.

E 3918, r.; E 3919, v.r.; E 3923, v.r.

4 PONTOCYPRIS SUBRENIFORMIS G. S. Brady 1880

Brady 1880, 38, pl. xv, fig. 2 *a-d*; Egger 1901, 421, pl. vii, fig. 50-52; Chapman 1915, 35.

Previously recorded (Brady) from Simon's Bay, South Africa, 15-20 fathoms and from Port Jackson, 2-10 fathoms. The "Gazelle" obtained it from Mauritius, Station 66 (Egger), at 411 metres. This species previously occurred in "Endeavour" material from Station 36, east of Tasmania, 777 fathoms.

E 3915, v.r.; E 3916, v.r.; E 3918, v.r.

Genus ARGILLOECIA G. O. Sars 1865

5 ARGILLOECIA BADIA G. S. Brady 1880

Brady 1880, 40, pl. vi, fig. 3 *a-d*; Egger 1901, 422, pl. iv, fig. 6, 7; Chapman 1919, 19.

Recorded from Port Jackson ("Challenger"), 210 fathoms. Egger ("Gazelle") recorded it from Station 90, off North-West Australia at 357 metres, and from Station 116 (off North-East Australia) at 951 metres. Chapman ("Aurora") noted it from south of Tasmania at 200 fathoms.

E 3923, v.r.

Genus MACROCYPRIS G. S. Brady 1868

6 MACROCYPRIS DECORA (G. S. Brady 1866)

Cytherideis decora Brady 1866, 366, pl. lvii, fig. 13 *a-c*.

Macrocypris decora, Brady, 1880, 44, pl. i, fig. 3 *a-d*, pl. vi, fig. 8 *a, b*; Chapman 1915, 37; 1919, 20.

Widely distributed in the Southern Hemisphere. Locations given by Brady ("Challenger") are: Culebra Island, 390 fathoms; North Brazil, 350 fathoms; Kerguelen Island, 120 fathoms; Admiralty Islands, 16 fathoms. The types of this species were from Australia, 17 fathoms (Brady 1866). The previous "Endeavour" record is, Station 36, east of Tasmania, 777 fathoms, frequent.

E 3915, f.; E 3916, v.r.; E 3917, v.r.; E 3918, r.; E 3919, v.r.; E 3923, v.r.

7 MACROCYPRIIS SETIGERA G. S. Brady 1880
(Pl. vii, fig. 5)

Brady 1880, 43, pl. i, fig. 1 *a-d*.; Egger 1901, 423, pl. i, fig. 21, 22.

This species was originally recorded from Port Jackson, at 2-10 fathoms. It is distinguished from *M. maculata* by the broader valve and evidence of bristle pits on the extremities. It may only be a variety of *M. maculata*, as Brady's earlier figures seem to show. Egger found this species at Station 90, North-West Australia at 357 metres, and near Mauritius at 411 metres ("Gazelle").

E 3915, f.; E 3917, v.r.; E 3923, v.r.

Genus BYTHOCYPRIS G. S. Brady 1880

8 BYTHOCYPRIS RENIFORMIS G. S. Brady 1880

Brady 1880, 46, pl. v, fig. 1 *a, b*; Egger, 425, pl. i, fig. 40, 41.

The "Challenger" records are: Culebra Island, North Brazil, Prince Edward Island, and off East Moncoeur Island, Bass Strait, 38-40 fathoms. Egger reports this species from Kerguelen Island, 104 metres ("Gazelle").

E 3918, v.r.; E 3919, v.r.; E 3920, v.r.

Genus BAIRDIA McCoy 1844

9 BAIRDIA ACANTHIGERA G. S. Brady 1868
(Pl. viii, fig. 4)

Brady 1868, 390, pl. xxvii, fig. 18-21, Idem 1880, 61, pl. ix, fig. 4 *a-c*; Egger 1901, 425, pl. ii, fig. 16-19; Chapman 1919, 22.

The type specimens came from the English Channel. Recorded by G. S. Brady off St. Vincent. Egger had it from Kerguelen, Fiji and West Africa. The present examples are fairly typical. From the "Aurora" soundings, 1,300 and 1,320 fathoms (Chapman).

E 3917, r.; E 3918, r.

10 BAIRDIA AMYGDALOIDES G. S. Brady 1866

Brady 1866, 364, pl. lvii, fig. 6 *a-c*, Idem, 1880, 54, pl. ix, fig. 5 *a-f*, pl. x, fig. 2 *a-c*.

Bairdia subdeltoidea, Egger (non Münster) 1901, 428, pl. ii, fig. 20, 21; Chapman 1915, 38.

Egger's record (as *B. subdeltoidea*) is Station 55, Kerguelen Island, 104 metres. Previous "Endeavour" records are: Station 36, east of Tasmania, 777 fathoms, frequent; 40 miles south of Cape Wiles, 100 fathoms.

E 3915, c.; E 3916, v.r.; E 3917, f.; E 3918, r.;
E 3919, v.r.; E 3921, v.r.; E 3922, v.r. E 3923, v.c.

11 BAIRDIA AUSTRALIS Chapman 1914

Bairdia ovata, Brady (non Bosquet sp.) 1866, 354, pl. lvii, fig. 7 *a-c*.

Bairdia ?ovata, Brady 1880, 53, pl. vii, fig. 3 *a-d*.

Bairdia australis Chapman 1914, 31, 32, pl. vi, fig. 7.

(For relationship and fossil distribution see the last reference, *supra cit.*).

The "Challenger" specimens were found at Station 140, Simon's Bay, South Africa, 15-20 fathoms, and east of New Zealand, 150 fathoms.

E 3917, v.r.; E 3918, v.r.; E 3919, v.r.; E 3920, v.r.; E 3923, f.

12 BAIRDIA cf. EXPANSA G. S. Brady 1880

Brady 1880, 58, pl. ix, fig. 2 *a-e*, Idem, 1890, 495; Chapman 1910, 430.

Recorded from Honolulu, 40 fathoms ("Challenger"); also South Sea Islands and Noumea in shallow water. Around Funafuti, in deep water, 1,050 and 1,215 fathoms.

E 3920, v.r.

13 BAIRDIA FOVEOLATA G. S. Brady 1867

Brady 1867, 56, pl. vii, fig. 4-6, Idem, 1880, 55, pl. viii, fig. 1 *a-f*, 2 *a-f*, Idem, 1890, 493; Egger 1901, 426, pl. ii, fig. 2-4; Chapman 1902, 423, Idem, 1910, 429.

Egger records it from Amboyna, 54 metres; Monrovia, West Africa, 68 metres; near Mauritius 411 metres. Around Funafuti in both shallow and deep water ($7\frac{1}{2}$ to 1,485 fathoms), Chapman. E 3915, v.r.

14 BAIRDIA FUSCA G. S. Brady 1866

Brady 1866 364, pl. lvii, fig. 9 *a-d*, Idem, 1880, 49, pl. vii, fig. 2 *a-d*; Egger 1901, 427, pl. vii, 46-49.

This species was dredged by the "Challenger" from Port Jackson, 2-10 fathoms. Egger records it from West Africa at 677 metres. Previous "Endeavour" material gave Station 36, east of Tasmania, 777 fathoms. E 3917, r.

15 BAIRDIA MINIMA G. S. Brady 1880

Brady 1880, 53, pl. vii, fig. 6 *a-g*; Egger 1901, 427, pl. ii, fig. 14, 15.

Egger's record for the "Gazelle" is Station 90, North-West Australia, 357 metres. E 3917, v.r.; E 3919, f.

Fam. CYTHERIDAE

Genus CYTHERE Müller 1785

16 *Cythere acerosella* sp. nov.

(Pl. viii, fig. 5)

Description—Valve seen from the side, subreniform, slightly higher in front than behind; anterior roundly curved, posterior broadly so; dorsal margin slightly curved and tapering posteriorly; ventral slightly sinuate in the middle. Seen from above, oblong, ovate, thickest in the middle, tapering to the anterior extremity and broadly to the posterior, both being sharply acuminate. End view, broadly ovate. Surface of valve sparsely covered with minute papillae, which are distinctly setose. Length, 0.88 mm.; greatest height, at anterior, 0.54 mm.

Observations—This species, in outline and form, belongs to the *Cythere kerguelensis* group of the genus, but has no surface pittings, these being otherwise represented by papillae. E 3917, v.r.; E 3920, v.r.; E 3923, v.r.

17 CYTHERE CANALICULATA (Reuss 1850)

Cypridina canaliculata Reuss 1850, 76, pl. ix, fig. 12.

Cythere canaliculata (Reuss), Egger 1858, 33, pl. v, fig. 10, 11; Brady 1866, 373, pl. lix, fig. 4 *a-f*, Idem 1880, 73, pl. xiv, fig. 7 *a-d*; Egger 1901, 432, pl. iv, fig. 15, 16; Chapman 1914, 32, pl. vi, fig. 8, Idem 1919, 23.

The first recent occurrence of this species in Australia was recorded by Brady from Hobson's Bay in 1866. It was later obtained in "Challenger" dredgings from E. Moncoeur Island, Bass Strait and at Port Jackson. Egger's recent forms were found in "Gazelle" dredgings, at Station 90, North-West Australia. The "Aurora" Antarctic Expedition (Mawson 1911-14) obtained this species south-west of Tasmania. Previous "Endeavour" material yielded this species from Station 36, east of Tasmania, 777 fathoms. It was found, in association with many other still living ostracods, in the Mallee Bores of Tertiary age in Victoria, and recorded in 1914. It ranges as far back as the Lower Miocene.

E 3921, v.r.; E 3922, v.r.

18 *CYTHERE CRISPATA* G. S. Brady 1868

Brady 1868, 221, pl. xiv, fig. 14, 15, Idem 1880, 72, pl. xiv, fig. 8 *a-d*; Chapman 1914, 33, pl. vi, fig. 9, Idem 1919, 23.

In lower latitudes this species seems to inhabit shallow water, as at Port Jackson, 2-10 fathoms; Booby Island, New Guinea, 6-8 fathoms; and Hong Kong, 7 fathoms. In the "Aurora" sample, however, it occurred to the south-west of Tasmania at 1,300 fathoms. Fossil in Lower Miocene strata in the Mallee Bores.

E 3920, v.r.; E 3923, v.r.

19 *CYTHERE CRISTATELLA* G. S. Brady 1880

G. S. Brady 1880, 90, pl. xix, fig. 6 *a-d*.

Dredged by the "Challenger" at Booby Island, at 6-8 fathoms. E 3915, r.

20 *CYTHERE CYTHEROPTEROIDES* G. S. Brady 1880

Brady 1880, 78, pl. iv, fig. 16-18; pl. xx, fig. 1 *a-f*.

The "Challenger" obtained specimens of this species from the Cape of Good Hope at 150 fathoms. From previous "Endcavour" material this species was obtained at Station 36, east of Tasmania, at 777 fathoms.

E 3915, r.

21 *CYTHERE DASYDERMA* G. S. Brady 1880

Brady 1880, 105, pl. xvii, fig. 4 *a-f*, pl. xviii, fig. 4 *a-f*; Chapman 1910, 432, Idem 1914, 34, pl. vi, fig. 10.

This is a distinctly deep water form. Brady gives 13 "Challenger" Stations of over 1,000 fathoms from which it was obtained. The greatest depth was at Funafuti at 1,485 fathoms (Chapman). Many localities in the Indian Ocean and South Pacific are given for this species. It was found as a fossil in the Lower Miocene of the Mallee Bores, Victoria.

E 3918, v.r.

22 *CYTHERE DEMISSA* G. S. Brady 1868

Brady 1868, 180, pl. xii, fig. 1, 2, Idem 1880, 66, pl. xii, fig. 1 *a-j*, Idem 1890, 497; Chapman 1914, 34, pl. vi, fig. 11.

This species was described from Port Jackson, 2-10 fathoms. It is a shallow water form. As a fossil it occurs in the Lower Pliocene of the Mallee Bores.

E 3918, v.r.; E 3922, v.r.

23 *CYTHERE DICTYON* G. S. Brady 1880

Brady 1880, 99, pl. xxiv, fig. 1 *a-y*; Egger 1901, 442 pl. vi, fig. 41-43; Chapman 1910, 433, Idem 1914, 34, pl. vii, fig. 12, 13, Idem 1915, 41.

This is another deep water form; fifteen of the "Challenger" Stations contained this species, which reached a depth of over one thousand fathoms. Egger records it from "Gazelle" dredgings from Kerguelen Island and Table Bay, South Africa. Previous "Endeavour" material contained this species, as follows: Station 36, east of Tasmania, 777 fathoms; and 40 miles south of Cape Wiles, 100 fathoms. It is fairly common in the Lower Miocene strata of the Mallee Bores.

E 3915, v.r.; E 3918, r.; E 3922, v.r.

24 *CYTHERE EXILIS* G. S. Brady 1880

Brady 1880, 69, pl. xvi, fig. 5 *a-h*; Egger 1901, 439, pl. vii, fig. 29-31.

The "Challenger" specimens came from Simon's Bay, South Africa, at 15-20 fathoms. The "Gazelle" dredged it from Kerguelen Island at 104 metres.

E 3922, v.r.

25 CYTHERE FALKLANDI G. S. Brady 1880

Brady 1880, 65, pl. xii, fig. 6 *a-f*.

The original locality for the species is Stanley Harbour, Falkland Island, 6 fathoms. E 3919, r.

26 CYTHERE FOVEOLATA G. S. Brady 1880

Brady 1880, 75, pl. xiii, fig. 5 *a-h*; Chapman 1915, 41, Idem 1916, 38, 49, pl. iv, fig. 2.

The "Challenger" specimens came from Christmas Harbour, Kerguelen Island, at 120 fathoms, and from Heard Island, at 75 fathoms. Typical specimens were found in the upthrust muds on the slopes of Mount Erebus on the "Nimrod" expedition (Chapman). Previous "Endeavour" material from Station 36, east of Tasmania, afforded this species, at 777 fathoms. E 3917, r.; E 3919, v.r.

27 CYTHERE GOUJONI G. S. Brady 1867

Brady 1867, 78, pl. x, fig. 9, 10, Idem 1880, 96, pl. xxv, fig. 7 *a-g*; Egger 1901, 431, pl. vi, fig. 29-31.

The "Challenger" found this species at Port Jackson, 2-10 fathoms; at Booby Island, 6-8 fathoms, and at Hong Kong Harbour, 7 fathoms. From the "Gazelle," Station 90, off North-West Australia, it was found at 357 metres.

E 3919, v.r.; E 3922, v.r.

28 CYTHERE INCONSPICUA G. S. Brady 1880

Brady 1880, 70, pl. xiii, fig. 1 *a-d*.

The "Challenger" obtained this species at one Station only, at Raines Island, Torres Strait, 155 fathoms. E 3918, r.

29 CYTHERE IRRORATA G. S. Brady 1880

Brady 1880, 108, pl. xviii, fig. 2 *a-d*.

Recorded from one "Challenger" Station, near the Admiralty Islands, at 16-25 fathoms. E 3919, v.r.

30 CYTHERE MILITARIS (G. S. Brady 1866)

Cythereis subcoronata G. S. Brady (non Speyer) 1866, 384, pl. lx, fig. 9 *a-c*.

Cythereis militaris G. S. Brady 1866, 385, pl. lxi, fig. 9 *a-d*.

Cythere clavigera G. S. Brady 1880, 109, pl. xxiii, fig. 7 *a-d*; Chapman 1914, 37, pl. vii, fig. 18.

In commenting on *Cythere clavigera* of the "Challenger" collection, Brady (1880, 110) says: "And it is just possible that the Australian species described in the same memoir (*Cythereis militaris*) may represent a very young specimen of *C. clavigera*." *C. militaris* (1866 Memoir) was from Hobson's Bay, Melbourne. The "Challenger" specimens were dredged from Port Jackson, at 2-10 fathoms. In the descriptions of Ostracoda from borings in the Victorian Mallee, the writer has shown that typical as well as varietal forms of the above species are very common in both Kalimnan (Lower Pliocene) and Lower Miocene strata in those borings. At the depth of 256-263 feet (Lower Pliocene) this species, in association with *Cythere dictyon*, another living species, was so abundant that it formed about 15 per cent. of the washings of a glauconitic clay in which they were embedded. E 3916, v.r.

31 CYTHERE NORMANI G. S. Brady 1880

Brady 1880, 101, pl. xvii, fig. 3 *a-d*, and (?) pl. xxvi, fig. 4 *a, b*; Chapman 1914, 37, pl. vii, fig. 19, Idem, 50, 73, pl. vi, fig. 2.

The "Challenger" specimens were dredged off Heard Island, Station 150, on coarse gravelly bottom at 150 fathoms. The examples described by the writer

in 1916 were from dredgings in the Ross Sea and from upthrust muds on Mount Erebus ("Nimrod"). This species dates, as a fossil, from the Lower Miocene of the Mallee Bore, and has been identified in late Tertiary deposits from a well-sinking in the Murray Flats, South Australia, by Brady. E 3915, v.r.

32 *Cythere obtusalata* G. S. Brady *tenuis* var. nov.

(Pl. ix, fig. 9)

Ref. to specific form—*Cythere obtusalata* G. S. Brady 1880, 91, pl. xii, fig. 1 *a-c*; Egger 1901, 443, pl. viii, fig. 12-15; Chapman 1914, 38, pl. vii, fig. 20.

Resembling Brady's type figure, excepting for the very delicate arculation or polygonal pitting and the thinner build of the shell. The outline of the carapace agrees with the specific form.

Brady's species was found in "Challenger" dredgings off E. Moncoeur Island, Bass Strait, 38-40 fathoms, and off Admiralty Islands, 16-25 fathoms. Egger records the species from Kerguelen; Monrovia, West Africa; and Mauritius ("Gazelle"). The writer found the species, *C. obtusalata*, in the Lower Miocene and the Lower Pliocene of the Mallee, Victoria.

E 3919, r.; E 3921, r.; E 3923, r.

33 *CYTHERE OVALIS* G. S. Brady 1880

Brady 1880, 66, pl. xiv, fig. 4 *a-d*; Chapman 1914, 38, pl. vii, fig. 21.

Brady's type specimens were dredged off Booby Island, 6 to 8 fathoms. The fossil specimens, from the Victorian Mallee, were found in Lower Miocene strata.

E 3918, v.r.

Cythere postcaudispinosa sp. nov.

(Pl. viii, fig. 3)

Description—Valve seen from the side, subrectangular, anterior extremity wider than posterior, roundly arched and bordered by a raised flange beset with a few denticles; narrower to posterior extremity which is terminated by a few stout teeth. Dorsal margin sinuate below the anterior third, thence sloping to posterior elevation. Ventral margin gently curved to meet the toothed extremity. Surface of valves anteriorly swollen and punctate, with prominent anterior median tubercle; posterior area slightly concave, without pittings. In profile the carapace is much more inflated than in the related Kalimnan to Lower Miocene fossil (*C. caudispinosa*) of the Sorrento Bore. It also lacks the long spine of the posterior extremity and the thickly punctate ornament of the Sorrento fossil (*Cythere caudispinosa* Chapman and Cressin. In Chapman, "The Sorrento Bore, Mornington Peninsula."—Records Geol. Surv. Vict., 5, pt. i, 1928, 125, pl. ix, fig. 64 *a, b*). Length, 0.8 mm.; greatest height, at anterior, 0.43 mm.; thickness of carapace, 0.03 mm.

E 3917, v.r.

35 *CYTHERE RASTROMARGINATA* G. S. Brady 1880

Brady 1880, 83, pl. xvi, fig. 1 *a-d*; Egger 1901, 442, pl. vi, fig. 5-9; Chapman 1914, 40, pl. vii, fig. 24.

The "Challenger" dredgings of *C. rastromarginata* were: off Reefs, Honolulu, 40 fathoms; off Moncoeur Island, Bass Strait, 38-40 fathoms; and Station 167, blue mud, between Sydney and New Zealand, 145-150 fathoms. The "Gazelle" soundings, recorded by Egger, containing this species, were from Fiji, Samoa and Western Australia. Fossil specimens of this species, fairly typical, came from the Tertiary of the Victorian Mallee.

E 3917, v.r.; E 3920, v.r.; E 3922, r.

36 CYTHERE SCUTIGERA G. S. Brady 1868

Brady 1868, 70, pl. viii, fig. 15, 16, Idem 1880, 109, pl. xxii, fig. 5 *a-f*; Chapman 1914, 41, pl. viii, fig. 27.

Brady's "Challenger" specimens came from Java, Amboyna and Papua. The fossil specimens from the Mallee Lower Miocene were typical though not so clearly sculptured. E 3923, r.

37 CYTHERE SUBRUFA G. S. Brady 1880

Brady 1880, 81, pl. xx, fig. 3 *a-f*.

From amongst the "Challenger" samples Brady recognised this species from Balfour Bay, Kerguelen, 20-50 fathoms, and Prince Edward's Island, 50-150 fathoms. E 3923, v.r.

38 CYTHERE TETRICA G. S. Brady

Brady 1880, 104, pl. xxiii, fig. 5 *a-d*.

"Challenger" specimens dredged off Booby Island, 6-8 fathoms (Station 87). E 3920, v.r.

Genus EUCYTHERE G. S. Brady 1868

39 EUCYTHERE DECLIVIS (Norman 1865)

(Pl. viii, fig. 10)

Cythere declivis Norman 1865, 16, pl. v, fig. 9-12.

Eucythere declivis G. S. Brady 1868, 430, pl. xxvii, fig. 22-26; Egger 1901, 449, pl. iv, fig. 65-67.

The species was previously recorded by the present writer from "Endeavour" soundings off Cape Wilkes, 25 years ago. A more typical example of this rare form is here figured. Its wide distribution is remarkable. Earlier records are from the coasts of Great Britain and Ireland (G. S. Brady), and off North-Western Australia at 357 metres (Egger, "Gazelle," Station 90). It was also found in the Pleistocene glacial clays of Scotland. E 3918, v.r.; E 3919, v.r.

Genus KRITHE Brady, Crosskey and Robertson 1874

40 KRITHE PRODUCTA G. S. Brady 1880

Brady 1880, 114, pl. xxvii, fig. 1 *a-j*; Egger, 1901, 451, pl. iv, fig. 17, 18; Chapman, 1902, 427, Idem 1910, 434.

The "Challenger" dredgings from which this species was recorded came from Pernambuco, North Brazil, Prince Edward's Island, and off Sydney at 410 fathoms. Egger's specimens from the "Gazelle" soundings came from Kerguelen Island and the north-west coast of Australia. In 1910 the writer recorded this species from around Funafuti (H.M.S. "Penguin") at the great depths of 1,489-2,715 fathoms. Previous "Endeavour" material (1915) showed it to occur at Station 36, east of Tasmania, 777 fathoms, common; and south of Tasmania at 1,122 fathoms. E 3915, f.; E 3918, v.r.

Genus LOXOCONCHA G. O. Sars 1865

41 LOXOCONCHA AUSTRALIS G. S. Brady 1880

Brady 1880, 119, pl. xxviii, fig. 5 *a-f*, pl. xxix, 3 *a-d*; Chapman 1914, 42, pl. viii, fig. 30, Idem 1915, 44.

In the latter reference, on pl. ii, fig. 6, a thin-shelled and nearly smooth form is figured as var. *tasmanica*. This has not been met with in the present samples, with the exception of a possibly solitary specimen. The "Challenger" met with this well-distributed Australian form at Port Jackson, 2-10 fathoms; Booby Island, 6-8 fathoms.

E 3918, r.; E 3919, v.r.; E 3920, v.r.;
E 3921, v.r.; E 3922, f.; E 3923, v.r.

42 LOXOCONCIA AVELLANA G. S. Brady 1880

Brady 1880, 117, pl. xxviii, fig. 1 *a-f*.

The "Challenger" examples were dredged at Port Jackson, 2-10 fathoms; and at Tongatabu, 18 fathoms.

E 3918, r.; E 3922, r.

Genus XESTOLEBERIS G. O. Sars 1865

43 XESTOLEBERIS CURTA (G. S. Brady 1866)

? *Cytheridea curta* G. S. Brady 1866, 370, pl. lviii, fig. 7 *a, b*.

Xestoleberis curta G. S. Brady 1868, 79, pl. x, fig. 16-18; Idem 1880, 126, pl. xxxi, fig. 6 *a-d*.

The "Challenger" dredgings containing this species are: Kerguelen Island, Port Jackson, Booby Island, Fiji, New Caledonia. The writer found this species at Funafuti to inhabit shallow to deeper water to 200 fathoms. It occurred as a Pliocene fossil in the Mallee Bores.

E 3915, r.; E 3920, v.r.

44 XESTOLEBERIS DAVIDIANA Chapman 1915

(Pl. viii, fig. 2)

Chapman 1915, 45; Idem 1916, 51, pl. vi, fig. 5, 6 (typical); Idem 1919, 32, pl. xxii, fig. 2, 2 σ (not typical).

The earlier references to the above species relate to the material collected as upthrust muds on the slopes of Mount Erebus, and also muds dredged in the Ross Sea by the "Nimrod," of the Shackleton Expedition of 1907-9. The "Aurora" specimens were obtained from several dredgings along the Ice Barrier, and also from South-East Tasmania towards Macquarie Island. Previous records of "Endeavour" material include south of Tasmania, 1,122 fathoms.

E 3916, v.r.; E 3917, r.

45 XESTOLEBERIS MARGARITEA (G. S. Brady 1866)

Cytheridea margaritea G. S. Brady 1866, 370, pl. lviii, fig. 6 *a-d*.

Xestoleberis margaritea (Brady) 1880, 127, pl. xxx, fig. 2 *a-g*; Egger 1901, 456, pl. iii, fig. 27-30; Chapman 1902, 429, Idem 1914, 43, pl. viii, fig. 32.

Records by Brady are Sponge sand, Mediterranean, and from the "Challenger," off Booby Island. Egger's "Gazelle" Stations are: Kerguelen and off the coast of West Australia. It was also found by the writer in shallow water round Funafuti, and as a Lower Miocene fossil in the Mallee Bores, Victoria.

E 3923, v.r.

46 XESTOLEBERIS NANA G. S. Brady 1880

Brady 1880, 127, pl. xxxi, fig. 5 *a-c*; Egger 1901, 456, pl. iii, fig. 31, 33; Chapman 1902, 430, Idem 1915, 46, Idem 1919, 32.

Recorded by Brady ("Challenger") off Tongatabu, 18 fathoms in coral bottom. Egger found it in "Gazelle" dredgings from Fiji, Samoa, and North-West Australia. The writer has noted its occurrence at Funafuti (South Pacific) at 18-200 fathoms, and also in "Aurora" soundings, west of Tasmania. Previous records in "Endeavour" material are: east of Tasmania, 1,122 fathoms, and 40 miles south of Cape Wiles, 100 fathoms.

E 3923, r.

47 XESTOLEBERIS POLITA G. S. Brady 1876

Brady 1876, 202, pl. xxvii, fig. 15, 16, Idem 1880, 127, pl. xxxi, fig. 7 *a-c*; Chapman 1919, 33.

The type specimens were obtained from the Straits of Magellan, and the "Challenger" examples came from Stanley Harbour, Falkland Islands, in 6 fathoms. The writer recorded the species from Mawson's "Aurora" dredgings from the west of Tasmania at 1,300 fathoms.

E 3923, v.r.

48 XESTOLEBERIS SETIGERA G. S. Brady 1880

Brady 1880, 125, pl. xxxi, fig. 2 *a-d*, 3 *a-c*; Egger 1901, 456, pl. iii, fig. 37-39; Chapman 1902, 428.

The "Challenger" specimens came from Kerguelen, Heard and Prince Edward's Islands. The "Gazelle" dredged it off Monrovia, West Africa. From Funafuti the writer obtained it from beach sand of Avalau, sand from the lagoon beach at Funafala, the lagoon dredgings Rocky Islet, lagoon dredgings $8\frac{1}{2}$ miles from the Mission Church at 12 fathoms, and off Tutanga at 50-60 fathoms.

E 3918, v.r.

49 XESTOLEBERIS VARIEGATA G. S. Brady 1880

Brady 1880, 129, pl. xxxi, fig. 8 *a-g*, Idem 1890, 508; Chapman 1902, 429, Idem 1914, 43, pl. viii, fig. 33, Idem 1915, 46, Idem 1919, 33.

The "Challenger" records for this species are: off St. Vincent, Cape Verde, at 1,070-1,150 fathoms; and off Tongatabu in 18 fathoms. Brady also found the species at Noumea in 2-6 fathoms, and in shallow water from seven localities in the South Sea Islands, in shore sands and reef pools. At Funafuti, *X. variegata* was found in lagoon dredgings in shallow water, and off Funamanu at 50 fathoms. Only one occurrence was noted from the "Aurora" dredgings, at Station 59, in 1,320 fathoms, near Western Tasmania. As a fossil this species was found in the Lower Miocene of the Victorian Mallee Bores (Chapman). But for the more swollen dorsal convexity, this fossil form was typical of the living form, even to the variegated surface markings. Previous "Endeavour" samples showed this species to occur at the Station 40 miles south of Cape Wiles, 100 fathoms.

E 3923, v.r.

Genus CYTHERURA G. O. Sars 1865

50 CYTHERURA COSTELLATA G. S. Brady 1880

Brady 1880, 134, pl. xxxii, fig. 7 *a-d*; Chapman 1916, 51, pl. vi, fig. 7, Idem 1919, 34.

The "Challenger" examples came from Balfour Bay, Kerguelen Island, 20-50 fathoms. From soundings in the Ross Sea and from upthrust muds on the slope of Mount Erebus, Shackleton Expedition, the writer obtained typical examples of this striking species. It also occurred in the "Aurora" dredgings opposite Kaiser Wilhelm II Land off the Ice Barrier, and off West Tasmania.

E 3918, v.r.; E 3922, v.r.

51 CYTHERURA CRYPTIFERA G. S. Brady 1880

Brady 1880, 134, pl. xxxii, fig. 4 *a-c*; Chapman 1919, 34.

When first described, this species was monotypic and represented by a single valve, which was found east of Moncoeur Island, Bass Strait, 37-40 fathoms. It was noted from previous "Endeavour" material (Chapman 1915, 46), when two valves were found in dredgings, east of Tasmania, in 777 fathoms. Since then the species has been found in dredgings by the "Aurora" (Mawson 1911-14) Expedition from the west of Tasmania at 1,300 and 1,320 fathoms. E 3918, v.r.

Genus CYTHEROPTERON G. O. Sars 1865

52 CYTHEROPTERON ASSIMILE G. S. Brady 1880

Brady 1880, 138, pl. xxxiv, fig. 3 *a-d*; Chapman 1902, 431

The "Challenger" examples were dredged off Christmas Harbour, Kerguelen Island, 120 fathoms, and off Heard Island in 75 fathoms. *C. assimile* was also found at Funafuti, in the beach sand, Avalau Islet, and in Sollas's second boring at 40 feet down.

E 3919, v.r.; E 3920, v.r.

53 CYTHEROPTERON DANNEVIGI Chapman 1915

Chapman 1915, 47, pl. iii, fig. 2 *a-c*.

The nearest relation to this form is *Cytheropteron wellingtoniense* G. S. B. The original type was obtained from Station 36, east of Tasmania, 777 fathoms.

E 3917, v.r.

54 *Cytheropteron hedleyi* sp. nov.

(Pl. vii, fig. 6, 7)

Description—Right valve subrhomboidal, anterior narrowly rounded; ventral border nearly straight, ending posteriorly in blunt wing. Dorsal margin steeply arched, posterior extremity sharply pointed. Height of carapace slightly more than half the length. Edge view of carapace broadly ovate, dorsal edge with a distinct flange. Ornament sparsely punctate; a deep fossa near the border of the alate margin. Length of carapace, .07 mm.; thickness of carapace, 0.76 mm.

Observations—Both *Cytheropteron wilesi* Chapman and *C. hedleyi* are related to *C. abyssorum* Brady, but probably not conspecific as all three differ strongly in ornament though not in shape.

E 3915, v.r.

Genus BYTHOCYTHERE G. O. Sars 1865

55 BYTHOCYTHERE ARENACEA G. S. Brady 1880

Brady 1880, 142, pl. xxxiii, fig. 3 *a-g* (*B. arenosa* on pl. xxxiii); Chapman 1902, 432; Chapman and Cressin 1928, 171.

This species was described from a "Challenger" specimen from Torres Strait, 155 fathoms. It was obtained from Funafuti, South Pacific, at Tutanga, 200 fathoms (Chapman). As a fossil it was found in the Kalimnan (Lower Pliocene) of the Sorrento Bore, at 605 feet (Chapman and Cressin).

E 3918, v.r.; E 3921, v.r.

Genus PSEUDOCYTHERE G. O. Sars 1865

56 PSEUDOCYTHERE CAUDATA G. O. Sars 1865

Sars 1865, 88; G. S. Brady 1868², 543, pl. xxxiv, fig. 49-52, pl. xli, fig. 6; Brady, Crosskey and Robertson 1874, 210, pl. ii, fig. 9; Brady 1880, 144, pl. i, fig. 6 *a-d*; Brady and Norman 1889, 225.

Brady recorded this species from Kerguelen Island and from Prince Edward's Island. It is also a northern species, found round the coasts of Britain; also fossil, from the Pleistocene of Scotland and Ireland.

E 3917, v.r.; E 3922, v.r.

57 PSEUDOCYTHERE FUEGIENSIS G. S. Brady 1880

Brady 1880, 145, pl. i, fig. 7 *a-d*; Egger 1901, 464, pl. viii, fig. 39, 40.

Brady's species was monotypic when described, from Tierra del Fuego. Much interest attaches to this discovery in the Tasman Sea, for, in 1901 Egger found another single valve, at Station 90, off North-West Australia ("Gazelle"). This third specimen comes from 33 miles east by south from Green Cape; it is a right valve, agreeing exactly in form and lineate ornament with Brady's type.

E 3918, v.r.

Fam. CYTHERELLIDAE

Genus CYTHERELLA Rupert Jones 1849

58 CYTHERELLA LATA G. S. Brady 1880

Brady 1880, 173, pl. xlv, fig. 5 *a-e*; Chapman 1914, 50, pl. ix, fig. 44 *a, b*; Chapman and Cressin 1928, 171.

A widely distributed species. Recorded from the "Challenger" dredging at Culebra Island, off the Azores, Pernambuco, Torres Strait and the Ki Islands. As a fossil it has been recorded from the Lower Miocene of the Sorrento Bore, and as a Miocene and Pliocene form from the Mallee Bores. E 3922, v.r.

59 CYTHERELLA POLITA G. S. Brady 1880

Brady 1880, p. 172, pl. xliii, fig. 5 *a-c*, pl. xlv, fig. 1 *a-g*; Chapman 1914, 50, pl. ix, fig. 45 *a-b*; Chapman and Crespin 1918, 171.

This species was found in "Challenger" dredgings at Wellington Harbour, New Zealand, in tow-net at trawl; and at the mouth of the Rio de la Plata, 13 fathoms. As a fossil it was found in the Lower Miocene to Pliocene of the Sorrento Bore, Mornington Peninsula and in the Lower Miocene and Lower Pliocene in the Victorian Mallee Bores. E 3917, r.; E 3922, v.r.

60 CYTHERELLA PULCHRA G. S. Brady 1866

Brady 1866, 361, pl. lvii, fig. 1 *a-d*, Idem 1880, 174, pl. xlv, fig. 3 *a, b*; Chapman 1914, 50, pl. ix, fig. 46 *a, b*; Chapman and Crespin 1928, 171.

This minute form is here represented by a valve having a length of 0.55 mm., against Brady's figured specimen with a length of 0.77 mm. Amongst other localities Brady has recorded it from Port Jackson. It was apparently well established in Lower Miocene times, for it occurs abundantly in strata of that age both in the Mallee Bores and that of Sorrento. E 3976, v.r.; E 3917, r.; E 3918, v.r.

61 CYTHERELLA PUNCTATA G. S. Brady 1866

(Pl. ix, fig. 11)

Brady 1866, 362, pl. lvii, fig. 2 *a, b*, Idem 1880, 174, pl. xxxvi, fig. 6 *a, b*, pl. xlv, fig. 4 *a-g*; Egger 1901, 469, pl. iv, fig. 34, 35; Chapman 1914, 51, pl. ix, fig. 47, Idem 1919, 42; Chapman and Crespin 1928, 171.

The localities given by the "Challenger" are Tristan d'Acunha, Port Jackson, Ki Islands, between Sydney and New Zealand, and the Straits of Magellan. Brady has figured a medio-sulcate form as *C. punctata*; as this seems to pass into *C. irregularis* Brady, these may have to be separated from *C. punctata*, sensu stricto. This species, *C. punctata* was also found in "Gazelle" dredgings, Station 90, off the North-West Australian coast.

The "Aurora" deep water dredgings which contained this species were taken off the east coast of Tasmania, in 1,180 and 1,300 fathoms. The fossil examples are quite typical and denote a Lower Miocene to Pliocene age from both the Mallee and the Sorrento Bores.

E 3915, v.r.; E 3916, v.r.; E 3918, r.; E 3920, v.r.; E 3922, v.r.; E 3923, v.e.

62 CYTHERELLA SEMITALIS G. S. Brady 1867

Brady 1867, 72, pl. viii, fig. 23, 24, Idem 1880, 175, pl. xlv, fig. 2 *a-e*.

This species was first described from north of Java. The "Challenger" samples containing this species were from Booby Island, 6-8 fathoms; Humboldt Bay, Papua, 37 fathoms; Nares Harbour, Admiralty Islands, 16 fathoms.

E 3918, v.r.

GENUS CYTHERELLOIDEA Alexander 1929

63 Cytherelloidea auris sp. nov.

(Pl. ix, fig. 10)

Description—Valve (right) somewhat depressed, subrectangular, with broadly rounded extremities. Dorsal margin gently sinuous. Ventral edge

slightly concave, with rounded margin. Anterior border with an inner, sulcated rim. Central area largely occupied by a thickened oval ring, having a central fossa nearly divided transversely. This central, raised, ridge-like feature is not so definitely cochleate as in the Tertiary *Cytherelloidea auricula* (Chapman), of the Mallee Bore and the Sorrento Bore. Length, 0.58 mm.; height, 0.34 mm.

Observations—The nearly related *Cytherelloidea auricula* (Chapman) (Proc. Roy. Soc. Vict., 27, pt. i, 49, pl. ix, fig. 42 a, b, 43) of the Tertiary of the Mallee and Sorrento Bores is similarly of a long rectangular shape, but the central ridge-like ring is more sinuous, narrow, and more nearly resembling the inner fold of the ear.

E 3922, v.r.

SUMMARY OF RESULTS

(a) On Hedley's Regional Areas of the Australian Coastline

The majority of these samples are beyond the mud-line. The present evidence, however, strongly supports the use of the terms first suggested by Charles Hedley for those regional areas that are primarily marked out by their shallower, molluscan fauna.

The *Solanderian* region takes in the coastline from Torres Strait to Moreton Bay, Queensland; the *Adelaidean* includes the south and south-west coasts of Australia, from Wilson's Promontory in Victoria to Shark Bay, and the north and west coasts of Tasmania; the *Peronian*, the remainder of the east coast of Australia and Tasmania and the south coast of Victoria; and the *Dampierian* from Torres Strait, North-East Australia, to Houtman's Abrolhos, below Shark Bay, West Australia.

In general support of these four divisions of the coastal regions, Iredale⁽⁵⁾ has drawn attention to the fact that, in regard to the *littoral* molluscan faunas, these are distinct if we take a central point in those regional areas; Sydney showing a pure Peronian assemblage, whilst Adelaide gives a typical Adelaidean fauna. At the same time, as one would expect, there is an overlapping of regional faunas near their respective boundaries.

This regional distribution also applies to that of the microzoa (the Foraminifera and Ostracoda), especially in the littoral zone (between tide-marks) and, to some extent, in the shallow water deposits between low-water mark and the 100 fathoms line. Two of the present samples, E 3915 and E 3923, come within that category.

Beyond the mud-line, however, including E 3916 to E 3922, a remarkable number of species, of both Foraminifera and Ostracoda, are included in the present lists, many of which are recorded for the first time as Northern or Southern types, respectively. This particular assemblage has a distinct bearing on the Antarctic or the Torresian origin of many of the species now found in the Australian deep water microzoic fauna. This points either to a vestigial southern or northern remanié fauna, as the case may be, or, possibly, and what is perhaps more likely, the direct influence of two opposite sets of currents. The actual existence of one, the northern, has been demonstrated by Charles Hedley, who consequently named these southward-flowing currents, the Notonectian.

For the occurrence and effect of the latter, Hedley cites several instances

⁽⁵⁾ Results from Roy Bell's Molluscan Collections, Proc. Linn Soc. N.S.W., 49, (3), 180.

where tropical and northern organisms have been found as far south as Flinders Island.⁽⁶⁾

It should, however, be borne in mind that even in the shallower soundings there are occasional stray species which show a similar origin; but they only prove the general rule, that by far the larger number of these apparently introduced forms are to be found where the deeper currents prevail.

In the paper above quoted, Iredale rightly points out, in discussing the distribution of his groups of mollusca, that he is there dealing only with the littoral faunas. As we have seen elsewhere, Hedley has occasionally found types of mollusca of a different or specialised character inhabiting the greater deeps of the ocean below the mud-line around the east and south-east coasts of Australia.

In regard to the deeper dredgings of the "Endeavour" at 470 and 505 fathoms, 33 miles east by south of Green Cape, the "strangers" brought from vast distances, most likely through the agency of persistent currents, are often very much in evidence.

Within the mud-line, however, as at Babel Island, at 65 fathoms, the following is perhaps a typical selection of species that are well established on the benthic feeding ground of the mud-line itself, perhaps in association with a few adventurous Notonectian forms.

Forms Typical of a 65 Fathom Level, North-east of Tasmania

FORAMINIFERA—

<i>Lenticulina cultrata</i>	<i>Quinqueloculina lamarckiana</i>
" sp. aff. <i>orbicularis</i>	" <i>vulgaris</i>
<i>Bolivina</i> sp. aff. <i>hentyana</i>	<i>Spiroloculina canaliculata</i>
" <i>beyrichi</i>	<i>Triloculina tricarinata</i>
<i>Streblus beccarii</i>	<i>Pyrgo fornasinii</i>
<i>Epistomina elegans</i>	<i>Pyrgoella sphaera</i>
<i>Anomalina glabrata</i>	<i>Biloculinella globulus</i>
" aff. <i>rotula</i>	<i>Haplophragmoides grandiformis</i>
" <i>vermiculata</i>	<i>Textularia conica</i>
<i>Cibicides</i> sp. aff. <i>victoriensis</i>	" <i>corrugata</i>
" <i>pseudoungerianus</i>	" <i>pseudogramen</i>
<i>Elphidium advenum</i>	<i>Clavulina serventyi</i>
" <i>verriculatum</i>	<i>Dorothyia arenata</i>
<i>Pelosina cylindrica</i>	<i>Gaudryina</i> aff. <i>rugosa</i>

OSTRACODA—

<i>Macrocypris decora</i>	<i>Bairdia amygdaloides</i>
" <i>maculata</i>	<i>Krithe producta</i>

(b) *Specific Elements of a Microzoic Fauna which may have been introduced by Deeper Currents beyond the Continental Shelf.*

Taking the samples E 3920, E 3921 and E 3922 at 470 to 505 fathoms as being typical of the blue, grey and green muds below the 100 fathom line, it is very enlightening to make a comparison of certain species contained therein which have a naturally northern or southern habitat. The following, therefore, are especially regarded as having been distributed by Notonectian or Antarctic currents, respectively:

(6) Chas. Hedley, Presidential Address, Linn. Soc. N.S.W., 1910, 30 (1), 10-12. For the Discussion of Regions, see Hedley—The Effect of the Bassian Isthmus upon the Existing Marine Fauna: a Study in Ancient Geography, *ibid.*, 1903, (4).

NOTONECTIAN

(Philippines, Andaman Islands, Ki Islands, Torres Strait)

FORAMINIFERA—

Vaginulina legumen	Cornuspira foliacea
Nodosaria fistuca	„ „ expansa
„ catenulata	„ lacunosa
„ pyrula semirugosa	Quinqueloculina cuvieriana
Lagenonodosaria scalaris	Spiroloculina canaliculata
Lagena clavata	Ptychomiliola separans
Rectobolivina bifrons	Pyrgo comata
Bifarina limbriata	„ fornasinii
Uvigerina sp. aff. pigmea	Haplophragmoides grandiformis
Parafrondicularia helenae	Textularia corrugata
Sphaeroidinella dehiscens	Dorothia arenata
Elphidium advenum	Gaudryina scabra
	„ robusta
	„ triangularis

OSTRACODA—

Cythere crispata	Xestoleberis curta
„ goujoni	Bythocythere arenacea
„ inconspicua	Cytherella lata
„ irrorata	„ punctata
„ scutigera	„ semitalis
Loxococoncha australis	

ANTARCTIC

(Great Ice Barrier, Kerguelen Islands, Heard Island, Falklands, New Zealand)

FORAMINIFERA—

Lagena annectens	Orbulina universa
„ crenata	Pulleniatina obliquiloculata
„ distoma	Globorotalia scitula
„ marginata	„ truncatulinoides
„ melo	Nonion depressulus
„ orbignyana	„ grateloupi
„ sulcata	„ scapha
Bulimina elegans	„ umbilicatus
Bolivina alata	Elphidium lessoni
„ robusta	Hyperammina novaezealandiae
Cassidulina crassa	Saccammina sphaerica
Ellipsolagena schlichti	Rhabdammina discreta
Bolivinita quadrilatera v. tortilis	Planispirina bucculenta
Patellina corrugata	Triloculina chrysostoma
Cibicides refulgens	„ tricarinata
Anomalina wuellerstorfi	Miliolinella oblonga
Chilostomella cushmani	Pyrgoella sphaera
Pullenia sphaeroides	Haplophragmoides emaciatus
„ subcarinata	Recurvoides contortus
Globigerina dutertrei	Reophax dentaliniformis
„ inflata	„ distans v. pseudodistans
„ pachyderma	„ scorpiurus
„ subcretacea	Textularia conica
„ triloba	Trochammina planoconvexa

OSTRACODA—

Bairdia australis	Xestoleberis davidiana
Cythere dictyon	„ setigera
„ exilis	Cytherura costellata
„ falklandi	Cytheropteron assimile
„ foveolata	Pseudocythere caudata
„ normani	„ fuegiensis
„ subrufa	

(c) *Evidence of Rapid Temperature Changes during the Deposition of Sample E 3917.*

The main facts leading to this conclusion are given on pp. 149, 150. These go to prove that the deposition of calcitic rhombs in such sediments must be due to fairly rapid changes in temperature which are taking place in the waters of Bass Strait.

(d) *General Nature of the Sediments of the present Samples.*

The majority are richly organic and largely calcareous. In four out of the nine samples there were small quantities of quartz sand present, as follows:

- E 3917 A minute quantity of angular quartz grains. Could not have travelled far from source, by weathering of continental rocks.
 E 3918 Occasional polished quartz grains. Probably wind-blown, and carried out to sea from desert regions.
 E 3919 A small proportion of fine angular quartz sand and other terrigenous material. Deposited not far from source of origin (continental).
 E 3922 Concretionary mud, stained with iron oxide. When dissolved in HCl, leaves a small residue of quartz sand (derived from continental rocks). The microzoa released by crushing are found to be marvellously perfect.

DEPOSITION OF TYPES AND DUPLICATE SPECIMENS DESCRIBED
IN THIS MONOGRAPH

The Director of the National Museum, Melbourne, Mr. D. J. Mahony, M.Sc., has kindly consented to undertake the care of the present collection. Former collections of the Microzoa described by me from the "Endeavour" soundings are also to be found in the collection of the National Museum, Melbourne.

ACKNOWLEDGMENT

The writer is greatly indebted to his friend, Walter J. Parr, F.R.M.S. (Mines Department, Melbourne), for discussions on the taxonomic position of several species contained in this paper.

BIBLIOGRAPHY OF FORAMINIFERA

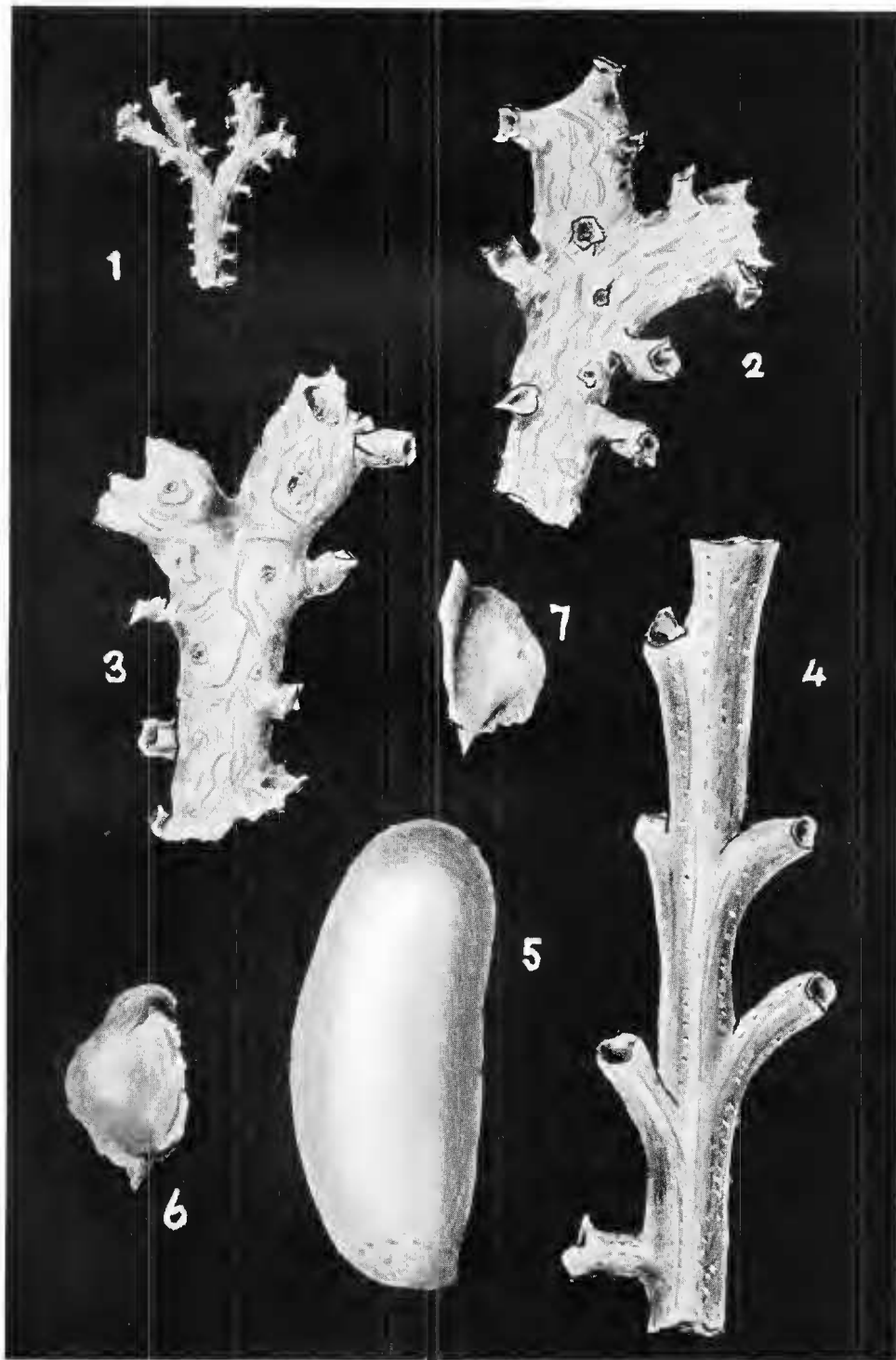
- BATSCII, A. J. 1791 Conchylien des Seesandes
 BRADY, H. B. 1864 Trans. Linn. Soc., Lond., 24
 BRADY, H. B. 1879 Quart. Jrn. Micr. Sci. 19
 BRADY, H. B. 1881 *Ibid*, 21
 BRADY, H. B. 1882 Proc. Roy. Soc. Edin.
 BRADY, H. B. 1884 "Challenger" Exped., Zool. 22, 9
 BRADY, PARKER and JONES 1870 Trans. Linn. Soc. Lond., 21
 BLAINVILLE, H. 1825 Manuel Malac. et Conch.
 BORNEMANN, J. G. 1855 Zeitschr. Deutsch. Geol. Gesellschaft, 7
 BURROWS, H., and HOLLAND, R. 1895 (in Jones, Parker and Brady) Pal. Soc., Mon.
 CARPENTER, W. B. 1868 Proc. Roy. Soc., 17

- CARPENTER, W. B. 1881 The Microscope and its Revelations, 6th ed.
- CHAPMAN, F. 1906 (for 1905) Trans. N.Z. Inst., 38
- CHAPMAN, F. 1907 Journ. Quekett Club, (2), 10
- CHAPMAN, F. 1907 Journ. Linn. Soc., Lond., 30
- CHAPMAN, F. 1909 Subantarctic Islands of New Zealand, 1
- CHAPMAN, F. 1910 Journ. Linn. Soc. Lond. Zool., 30
- CHAPMAN, F. 1915 "Endeavour" Sci. Results, 3, (1)
- CHAPMAN, F. 1916 Shackleton Brit. Antarctic Exped. 1907-9. Geol. 2, (2)
- CHAPMAN, F. 1916¹ *Ibid*, Geol. 2, (3)
- CHAPMAN, F. 1916² Vict. Nat., 32
- CHAPMAN, F. 1924 Rep. Sth. Afric. Govt. Fisheries for 1922, No. 11
- CHAPMAN, F., and PARR, W. J. 1926 Journ. Linn. Soc., Lond., 36
- CHAPMAN, F., PARR, W. J., and COLLINS, A. C. 1934 *Ibid*, 38
- CHAPMAN, F., and PARR, W. J. 1935 Journ. Roy. Soc. W. Aust., 21
- CHAPMAN, F., and PARR, W. J. 1937 Mawson Antarctic Exped. 1911-14, Ser. C, 1, (2)
- COSTA, O. G. 1856 Atti dell' Accad. Pontan, 7, fasc. 2
- CUSHMAN, J. A. 1910 Bull. U.S. Nat. Mus., 71, (i)
- CUSHMAN, J. A. 1911 *Ibid*, 71, (ii)
- CUSHMAN, J. A. 1913 *Ibid*, 71, (iii)
- CUSHMAN, J. A. 1913 Proc. U.S. Nat. Mus., 44
- CUSHMAN, J. A. 1918-31 Bull. U.S. Nat. Mus., 104
- CUSHMAN, J. A. 1919 Proc. U.S. Nat. Mus., 56
- CUSHMAN, J. A. 1921 Bull. U.S. Nat. Mus., 100
- CUSHMAN, J. A. 1922 Carnegie Inst., 17
- CUSHMAN, J. A. 1924 Carnegie Inst., Publ. 342
- CUSHMAN, J. A. 1927 Contr. Cushm. Lab., 3
- CUSHMAN, J. A. 1928 Contr. Cushm. Lab., 4, (i)
- CUSHMAN, J. A. 1932 Bull. U.S. Nat. Mus., 161
- CUSHMAN, J. A. 1936 Spec. Publ. No. 6
- CUSHMAN, J. A. 1937 Spec. Publ. No. 7
- CUSHMAN, J. A. 1937¹ Spec. Publ. No. 9
- CUSHMAN, J. A. 1937² Contr. Cushm. Lab., 13
- CUSHMAN, J. A., and OZAWA, Y. 1930 Proc. U.S. Nat. Mus., 77, Art. 6
- CUSHMAN, J. A., and WHITE, E. M. 1936 Contr. Cushm. Lab., 12
- DEFRANCE, J. L. M. 1824 Dict. Sci. Nat., 32
- EGGER, J. G. 1857 Neues Jahrb. f. Min.
- EGGER, J. G. 1893 Foram. "Gazelle" (1874-6), Abhandl. k. bayer, Ak. Wiss., Wien, Cl. ii, 18, (2)
- FISCHER DE WALDHEIM, G. 1817 Adversaria Zoologica. Mém. Soc., Imp. Nat. Moscou, 5
- FORNASINI, C. 1895 Contributo a la Conoscenza de la Bulimine Adriatiche. Bologna (privately printed)
- FORNASINI, C. 1901 Accad. Sci. Ist. Bologna, Mém., (5), 9
- FORNASINI, C. 1905 *Ibid*, Mém., (6), 2
- GOËS, AXEL 1894 K. Svenska Vet. Akad., Handlingar, 25, No. 9
- HERON-ALLEN and EARLAND 1915 Trans. Zool. Soc. Lond., 20, (17)
- HERON-ALLEN and EARLAND 1922 "Terra Nova" Exped., Zool. vi, No. 2
- HERON-ALLEN and EARLAND 1924 Journ. Roy. Micr. Soc., Lond.
- HERON-ALLEN and EARLAND 1932 "Discovery" Reports, 4
- JONES, PARKER and BRADY 1866 Pal. Soc. Mon., 19

- KARRER, F. 1877 Geologie der Kaiser Franz - Josefs Hochquellen-Wasserleitung, Abhandl. k.k. Geol. Reichsanstalt, 9
- LAMARCK, 1804 Annales du Muséum, Paris, 5 and 9
- LAMARCK 1811 In Parkinson's "Organic Remains of a Former World"
- LAMARCK 1815-1822 Histoire Naturelle des Animaux sans Vertebres, 2 1816, 7 1822
- MILLETT, F. W. 1898-1904 Journ. Roy. Micr. Soc., Lond.
- MONTAGU, G. 1803 Testacea Britannica
- MONTAGU, G. 1804 In Brown's "Illustrated Recent Conchology"
- MONTFORT, P. DENYS DE 1808 Conchyliologie Systematique, 1
- MÜNSTER, G. 1838 (in Roemer, F. A.) Neues Jahrbuch für Min.
- D'ORBIGNY, A. 1826 Ann. Sci. Nat., 7
- D'ORBIGNY, A. 1839¹ In Barker-Webb and Berthelot's "Histoire Naturelle Iles Canaries"
- D'ORBIGNY, A. 1839² In Ramon de la Sagra's "Histoire Physique, Politique et Naturelle de l' Ile de Cuba"
- D'ORBIGNY, A. 1839³ Voyage dans l' Amerique Meridionale, (3), 5
- D'ORBIGNY, A. 1840 Mém. Soc. Géol. France 4
- D'ORBIGNY, A. 1846 For. Foss., Vienne
- PARKER and JONES 1865 Phil. Trans. Roy. Soc., Lond.
- PARKER, JONES and BRADY 1865 Ann. Mag. Nat. Hist., (3), 16
- PARR, W. J. 1932 Proc. Roy. Soc. Vict., 44, (2)
- PARR and COLLINS 1930 Proc. Roy. Soc. Vict., 43, (i)
- PARR and COLLINS 1937 Proc. Roy. Soc. Vict., 50
- PHILIPPI, R. A. 1844 Enumeratio Molluscorum Siciliae, 2
- REUSS, A. E. 1850 Denkschriften k. Ak. Wiss., Wien, 1
- REUSS, A. E. 1851 Haidinger's "Naturw. Abhandl.," 4
- REUSS, A. E. 1854 Denkschr. k. Ak. Wiss., Wien, 7, (1)
- REUSS, A. E. 1858 Zeitschr. d. d. Geol. Gesellschaft, 10
- REUSS, A. E. 1862¹ Sitz. d. k. Ak. Wiss., Wien, 46, (1)
- REUSS, A. E. 1862² Sitz. d. k. Ak. Wiss., Wien, 46, (1)
- REUSS, A. E. 1864 Sitz. d. k. Ak. Wiss., Wien, 48, (1)
- SCHLUMBERGER, C. 1891 Mém. Soc. Geol. France, 4
- SCHWAGER, C. 1866 "Novara" Exped., Geol. Theil, 2
- SIDEBOTTOM, H. 1918 Journ. Roy. Micr. Soc., Lond.
- SILVESTRI, A. 1902 Mem. d. Pont. Accad. Romania, Nuovi Lincéi, 19
- TERQUEM, O. 1876 Anim. sur la Plage de Dunkérque
- WALKER and BOYS 1784 Testacea minuta rariora . . . in arena littoris Sandvicensis
- WALKER and JACOB 1798 In Adams' Essays
- WILLIAMSON, W. C. 1858 Ray Society, London

BIBLIOGRAPHY OF OSTRACODA

- BRADY, G. S. 1866 Trans. Zool. Soc. Lond., 5
- BRADY, G. S. 1867 Les Fonds de la Mer., 1
- BRADY, G. S. 1868¹ Trans. Linn. Soc. Lond., 26
- BRADY, G. S. 1868² Ann. and Mag. Nat. Hist., (4), 2
- BRADY, G. S. 1878 Trans. Zool. Soc. Lond.
- BRADY, G. S. 1880 "Challenger" Exped., Zool., (iii)
- BRADY, G. S. 1890 Trans. Roy. Soc. Edin., 35
- BRADY, CROSSKEY and ROBERTSON 1874 Pal. Soc. Mon.
- BRADY and NORMAN 1889 Trans. Roy. Dublin Soc., (2), 4
- BOSQUET, J. 1853 Crustacées fossils, Limburg
- CHAPMAN, F. 1902 Journ. Linn. Soc. Lond. Zool., 28



Polyzoa and Ostracoda, F.I.S. "Endeavour," E 3915

F. Chapman, del. ad nat.